



# 104QX

Loader

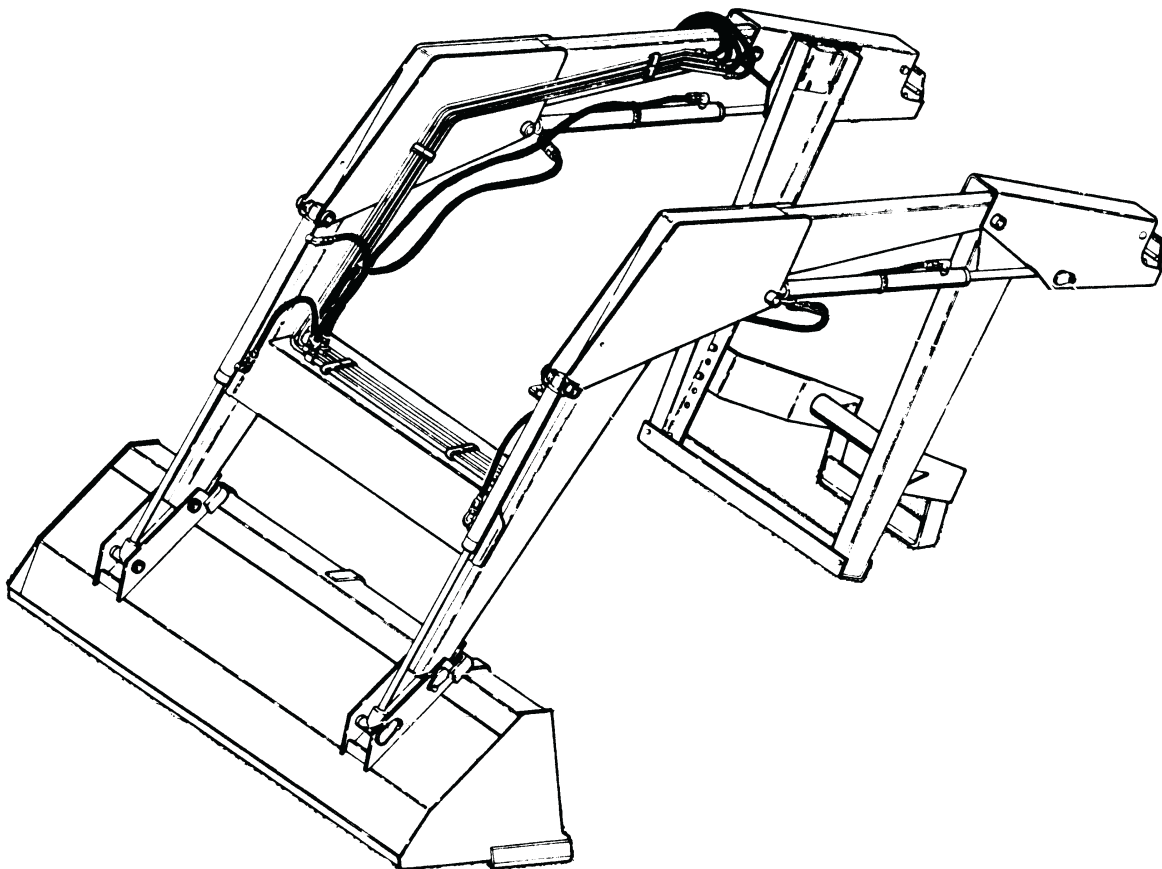
Published 1/02

Part No. F-3672

## OPERATOR'S MANUAL



This Operator's Manual is an integral part of the safe operation of this machine and must be maintained with the unit at all times. READ, UNDERSTAND, and FOLLOW the Safety and Operation Instructions contained in this manual before operating the equipment.



**RHINO®**

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# TO THE OWNER/OPERATOR/DEALER

All implements with moving parts are potentially hazardous. There is no substitute for a cautious, safe-minded operator who recognizes the potential hazards and follows reasonable safety practices. The manufacturer has designed this implement to be used with all its safety equipment properly attached to minimize the chance of accidents.

**BEFORE YOU START!!** Read the safety messages on the implement and shown in your manual. Observe the rules of safety and common sense!

## **SAFETY HAZARD SIGNAL WORDS**

There are three levels of hazard intensity identified by signal words DANGER, WARNING and CAUTION. The level of hazard intensity is identified by the following definitions.



**DANGER** - Immediate hazards which will result in severe injury or death.



**WARNING** - Hazards or unsafe practices which could result in minor personal injury or death.



**CAUTION** - Hazards or unsafe practices which could result in minor personal injury or property damage.



THIS SAFETY SYMBOL MEANS

**ATTENTION!**

**BECOME ALERT!**

**YOUR SAFETY IS INVOLVED!**



### **LEA EL INSTRUCTIVO**

Si No Lee Ingles, Pida Ayuda a Alguien Que Si Lo Lea Que le Traduzca las Medidas de Seguridad.

Read and understand the complete Warranty Statement found in this Manual. Fill out the Warranty Registration Form in full and return it within 30 Days. Make certain the Serial Number of the Machine is recorded on the Warranty Card and on the Warranty Form that you retain. The use of "will-fit" parts will void your warranty and can cause catastrophic failure with possible injury or death.

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# **SAFETY SECTION**

# SAFETY

## SAFETY

### **SAFETY PRECAUTIONS**

A careful operator operates best. Most accidents can be avoided by observing certain precautions. Read all precautions that follow before operating your tractor and loader to help prevent accidents. Equipment should be operated only by those who are responsible and instructed to do so.

#### **GENERAL**

1. Read your Operator's Manuals carefully before using tractor or loader. Lack of operating knowledge can lead to accidents.
2. Replace damaged or illegible safety decals. See page 1-10 for required decals.
3. Operate tractor and loader only from operator's seat.

#### **TRACTOR**

1. Use an approved roll bar and seat belt for safe operation. Overturning a tractor without a rollbar can result in death or injury. If your tractor is not equipped with a rollbar and seat belt, see your Tractor Dealer.
2. Equip your tractor with FOPS (Falling Object Protective Structure) before installing or operating loader.
3. Always use seat belt when rollbar is installed. Do not use seat belt if rollbar is removed from tractor.
4. Add recommended wheel ballast and/or rear weight as recommended in owner's manual to provide good stability.
5. Move rear wheels to widest settings recommended to increase stability.
6. Move and turn tractor at low speeds.

#### **LOADER**

1. Improper use of a loader can cause serious injury or death.
2. Do not lift or carry anybody on loader, in bucket or on attachment.
3. Never allow anyone to get under loader bucket or reach through lift arms when bucket is raised.
4. Do not walk or work under a raised loader or bucket or attachment unless it is securely blocked or held in position.
5. Avoid overhead wires and obstacles when loader is raised. Contacting electric lines can cause electrocution.
6. Make sure all parked loaders are on a hard, level surface. Engage all safety devices.

#### **OPERATING LOADER**

1. As owner of this loader, it is your responsibility to be certain anyone operating this loader has read this manual first to be aware of safe operation of your tractor and loader.
2. Exercise caution when operating any loader with a raised loaded bucket or fork.
3. Avoid loose fill, rocks and holes. They can be dangerous for loader operation or movement.
4. Use care when operating on steep grades to maintain proper stability. Always carry bucket or attachment as low as possible.
5. Allow for loader length when making turns.

6. Stop loader arms gradually when lowering or lifting.
7. Use caution when handling loose or shiftable loads.
8. Carry bucket or attachment at a low position during transport for better visibility.
9. When parking or servicing, lower bucket to ground, stop engine and set park brakes before leaving tractor seat.
10. Operate loader controls only when properly seated at controls.
11. Using front end loaders without special attachments for handling large heavy objects such as large round or rectangular bales, logs and oil drums is **NOT RECOMMENDED**.
12. Handling large heavy objects can be extremely dangerous due to:
  - Danger of rolling tractor over.
  - Danger of upending tractor.
  - Danger of objects rolling or sliding down loader arms onto operator.
13. If you must perform this sort of work (see 12 above), protect yourself by:
  - Use proper attachments only.
  - Never lift load higher than necessary to clear ground when moving.
  - Ballast tractor rear to compensate for load.
  - Never lift large objects with equipment that does not have an anti-rollback device.
  - Move slowly and carefully, avoiding rough terrain.

#### **MAINTENANCE**

1. When servicing or replacing pins in cylinder ends, buckets, etc., always use a drift and hammer of non-sparking material. Failure to do so could result in injury from flying metal fragments.
2. Do not modify or alter or permit anyone else to modify or alter loader or any of its components or any loader function without first consulting your Dealer. If you have any questions regarding loader modifications contact your Rhino Dealer.
3. Always wear safety goggles when servicing or repairing tractor or loader.
4. Escaping hydraulic/diesel fluid under pressure can penetrate skin causing serious personal injury.
  - **DO NOT** use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks.
  - Stop engine and relieve pressure before connecting or disconnecting hydraulic or diesel lines.
  - Tighten all connections before starting engine or pressurizing lines.
  - If any fluid is injected into skin, obtain medical attention immediately or gangrene may result.
5. Do not tamper with relief valve setting. Valve relief is factory-set. Changing relief setting can cause overloading of your tractor or loader and serious operator injury may result.

Whenever you see this symbol



It means: **ATTENTION!  
BECOME ALERT!  
YOUR SAFETY IS INVOLVED!**

# SAFETY

## PELIGRO!



Si no lee Ingles, pida ayuda a alguien que si lo lea para que le traduzca las medidas de seguridad.

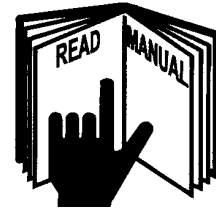


¡LEA EL INSTRUCTIVO!

## DANGER!



Never operate the Power Unit or Implement until you have read and completely understand this Manual, the Power Unit Operator's Manual, and each of the Safety Messages found in the Manual or on the Power Unit and Implement. Learn how to stop the Power Unit engine suddenly in an emergency. Never allow inexperienced or untrained personnel too operate the Power Unit and Implement without supervision. Make sure the operator has fully read and understood the manuals prior to operation.



## WARNING!



Always maintain the safety decals in good readable condition. If the decals are missing, damaged, or unreadable, obtain and install replacement decals immediately.

## WARNING!



Make certain that the "Slow Moving Vehicle" (SMV) sign is installed in such a way as to be clearly visible and legible. When transporting the Equipment use the Power Unit flashing warning lights and follow all local traffic regulations.

## WARNING!



Operate this Equipment only with a Tractor equipped with an approved roll-over-protective system (ROPS). Always wear seat belts. Serious injury or even death could result from falling off the tractor—particularly during a turnover when the operator could be pinned under the Operator Protective Structure.



## WARNING!



Do not modify or alter this Implement. Do not permit anyone to modify or alter this Implement, any of its components or any Implement function.

## DANGER!



BEFORE leaving the Power Unit seat, always engage the brake and/or set the Power Unit transmission in parking gear, disengage the auxiliary hydraulics, stop the engine, remove the key, and wait for all moving parts to stop. Place the Power Unit shift lever into a low range or parking gear to prevent the tractor from rolling. Never dismount a Power Unit that is moving or while the engine is running. Operate the Power Unit controls from the operator seat only.

SAFETY

# SAFETY

## SAFETY

### DANGER!

Never allow children to operate or ride on the Power Unit or Implement.



### DANGER!

Do not mount the Power Unit while the Power Unit is moving. Mount the Power Unit only when the Power Unit and all moving parts are completely stopped.



### DANGER!

Start the Power Unit only when properly seated in the Power Unit seat. Starting a Power Unit in gear can result in injury or death. Read the Power Unit operator's manual for proper starting instructions.



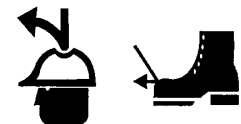
### DANGER!

Never work under the Implement, the framework, or any lifted component unless the Implement is securely supported or blocked up to prevent sudden or inadvertent falling which could cause serious injury or even death.



### WARNING!

The operator and all support personnel should wear hard hats, safety shoes, safety glasses, and proper hearing protection at all times for protection from injury including injury from items thrown by the equipment.



### WARNING!

**PROLONGED EXPOSURE TO LOUD NOISE MAY CAUSE PERMANENT HEARING LOSS!** Tractors with or without an Implement attached can often be noisy enough to cause permanent hearing loss. We recommend that you always wear hearing protection if the noise in the Operator's position exceeds 80db. Noise over 85db over an extended period of time will cause severe hearing loss. Noise over 90db adjacent to the Operator over an extended period of time will cause permanent or total hearing loss. *Note: Hearing loss from loud noise [from tractors, chain saws, radios, and other such sources close to the ear] is cumulative over a lifetime without hope of natural recovery*





# SAFETY

SAFETY

## DANGER!



Do not operate this Equipment with hydraulic oil leaking. Oil is expensive and its presence could present a hazard. Do not check for leaks with your hand! Use a piece of heavy paper or cardboard. High-pressure oil streams from breaks in the line could penetrate the skin and cause tissue damage including gangrene. If oil does penetrate the skin, have the injury treated immediately by a physician knowledgeable and skilled in this procedure.



## DANGER!



Transport only at safe speeds. Serious accidents and injuries can result from operating this equipment at unsafe speeds. Understand the Power Unit and Implement and how it handles before transporting on streets and highways. Make sure the Power Unit steering and brakes are in good condition and operate properly.



Before transporting the Power Unit and Implement, determine the safe transport speeds for you and the equipment. Make sure you abide by the following rules:

1. Test the Power Unit at a slow speed and increase the speed slowly. Apply the Brakes smoothly to determine the stopping characteristics of the Power Unit and Implement. As you increase the speed of the Power Unit the stopping distance increases. Determine the maximum safe transport speed for you and this Equipment.
2. Test the equipment at a slow speed in turns. Increase the speed through the turn only after you determine that it is safe to operate at a higher speed. Use extreme care and reduce your speed when turning sharply to prevent the Power Unit and Implement from turning over. Determine the maximum safe turning speed for you and this equipment before operating on roads or uneven ground.
3. Only transport the Power Unit and Implement at the speeds that you have determined are safe and which allow you to properly control the equipment.



Be aware of the operating conditions. Do not operate the Power Unit with weak or faulty brakes. When operating down a hill or on wet or rain slick roads, the braking distance increases: Use extreme care and reduce your speed. When operating in traffic always use the Power Unit's flashing warning lights and reduce your speed. Be aware of the traffic around you and watch out for the other guy.

## WARNING!

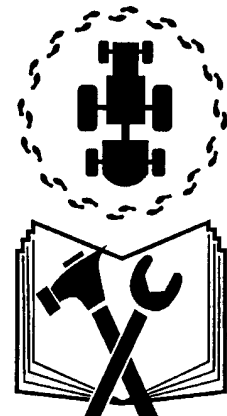


Never attempt to lubricate, adjust, or remove material from the Implement while it is in motion or while Power Unit engine is running. Make sure the Power Unit engine is off before working on the Implement!

## WARNING!



Periodically inspect all moving parts for wear and replace when necessary with authorized service parts. Look for loose fasteners, worn or broken parts, and leaky or loose fittings. Make sure all pins have cotter pins and washers. Serious injury may occur from not maintaining this machine in good working order.



# SAFETY

SAFETY

## WARNING!



Always read carefully and comply fully with the manufacturers instructions when handling oil, solvents, cleansers, and any other chemical agent.



## DANGER!



Never run the Power Unit engine in a closed building or without adequate ventilation. The exhaust fumes can be hazardous to your health.

## DANGER!



**KEEP AWAY FROM ROTATING ELEMENTS** to prevent entanglement and possible serious injury or death.



## DANGER!



Never allow children to play on or around Power Unit or Implement. Children can slip or fall off the Equipment and be injured or killed. Children can cause the Implement to shift or fall crushing themselves or others.

## WARNING!



Do not exceed the rated PTO speed for the Implement. Excessive PTO speeds can cause Implement driveline failures resulting in serious injury.

## DANGER!



**NEVER use drugs or alcohol** immediately before or while operating the Power Unit and Implement. Drugs and alcohol will affect an operator's alertness and coordination and therefore affect the operator's ability to operate the equipment safely. Before operating the Power Unit or Implement, an operator on prescription or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to operate the Equipment safely. **NEVER** knowingly allow anyone to operate this equipment when their alertness or coordination is impaired. Serious injury or death to the operator or others could result if the operator is under the influence of drugs or alcohol.



## DANGER!



Operate the Power Unit and/or Implement controls only while properly seated in the operator's seat with the seat belt securely fastened around you. Inadvertent movement of the Power Unit or Implement may cause serious injury or death.

# SAFETY

**WARNING!** Never interfere with factory-set hydraulic calibrations. Any change in calibration could cause a failure of the equipment and result in injury.



**DANGER!** Always shut the Power Unit completely down, place the transmission in park, and set the parking brake before you or anyone else attempts to connect or disconnect the Loader.



**DANGER!** Never crawl under a raised implement supported solely by the Power Unit boom. Release of the control lever or mechanical failure will result in the Implement falling and possible injury or death. Always securely block up the Implement before crawling underneath to perform repairs and service.



**WARNING!** Relieve hydraulic pressure prior to doing any maintenance or repair work on the implement. Place the Loader on the ground or securely supported on blocks or stands, disengage the auxiliary hydraulics and turn off engine. Push and pull the control levers several times to relieve pressure prior to starting any maintenance or repair work.



## SAFETY HAZARD SIGNAL WORDS

There are three levels of hazard intensity identified by signal words DANGER, WARNING and CAUTION. The level of hazard intensity is identified by the following definitions.



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**WARNING** - Hazards or unsafe practices which could result in minor personal injury or death.



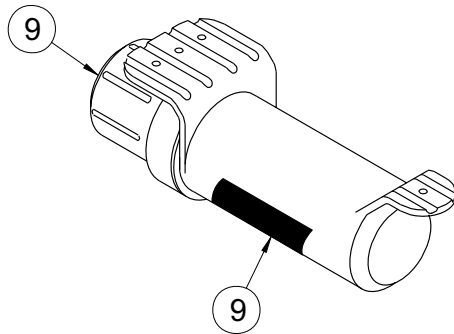
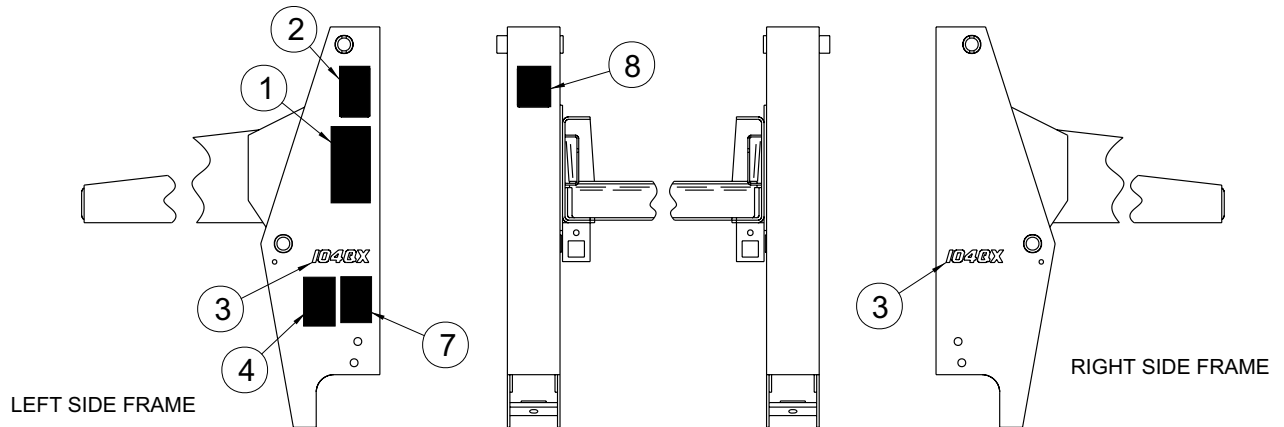
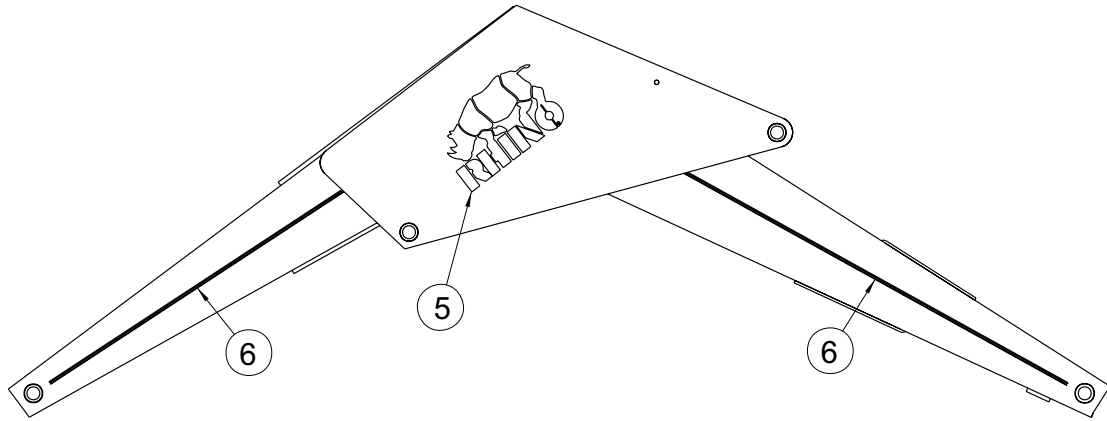
**CAUTION** - Hazards or unsafe practices which could result in minor personal injury or property damage.



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**YOUR SAFETY IS INVOLVED!**

# SAFETY

SAFETY



# SAFETY


SAFETY

ITEM	PART NO.	QTY.	TYPE	DESCRIPTION
1	26871	1	WARNING	To Prevent Instability
2	7794	1	CAUTION	Loader Safety Guides
3	38789	2	MODEL	104QX
4	36932	1	WARNING	Avoid Injury During Installation
5	49696	2	LOGO	Rhino
6	35674-6	1	STRIPE	Silver, 13.5 ft.
7	48921	1	DANGER	Stability Danger
8	48858	1	DANGER	Electric Shock Danger
9	00776481	1	MANUAL CANISTER	2 items

# SAFETY

SAFETY

**NOTE:** Safety decal location is listed below each decal. Replace decal if damaged or illegible. Replacement decals are available from your dealer.




**CAUTION**

**LOADER SAFETY GUIDES**

1. Move and turn tractor at low speeds.
2. Carry loader arms at a low position during transport.
3. Lower loader arms, stop engine and lock brakes before leaving operator's seat.
4. Do not stand or work under a raised loader.
5. Add recommended wheel ballast or rear weight for stability.
6. Move wheels to widest recommended settings to increase stability.
7. Observe safety recommendations in instruction manual.

7794

2 - - 7794



**WARNING**

1. Use of front end loaders for handling large heavy objects; such as large round bales, large rectangular bales, logs, oil drums, etc; is **NOT** recommended.
2. Handling large heavy objects can be extremely dangerous due to:
  - Danger of rolling the tractor over
  - Danger of upending the tractor
  - Danger of the object rolling or sliding down the loader arms onto the operator
3. If you must perform this sort of work, protect yourself by:
  - Never lifting higher than necessary to clear the ground when moving
  - Ballast tractor rear to compensate for load
  - Never lifting large objects with equipment that does not have an anti-rollback device.
  - Move slowly and carefully, avoiding rough terrain.

26871

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**WARNING**

**TO AVOID INJURY DURING REMOVAL OR REINSTALLATION OF QUICK-TACH LOADER:**

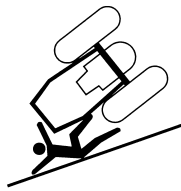
- Place loader bucket against barrier to restrict forward movement of loader.
- Do not permit bystanders within 10 feet of loader.
- Do not repair loader if it is not mounted on the tractor. Loss of oil or removal of parts could cause loader to collapse resulting in injury.
- Read and understand instructions in operator's manual.

36932

4 - - 36932



**DANGER**



- Use ROPS and seatbelt at all times.
- Add recommended rear ballast.
- Operate tractor at low speeds.

Failure to comply may result in serious injury or death.

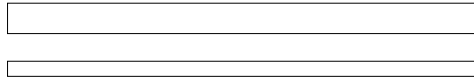
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# SAFETY

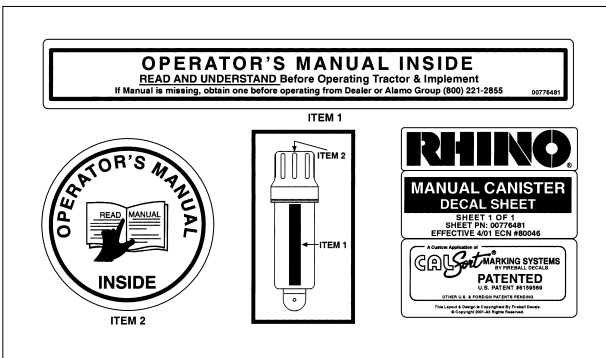
SAFETY

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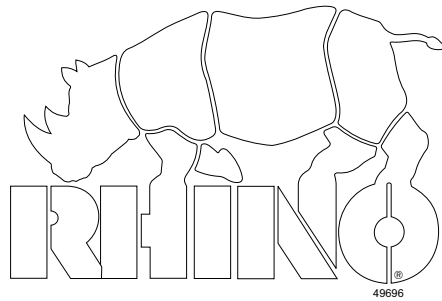


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6 - - 35674-6



9 - - 00776481



5 - - 49696



8 - - 48858

# SAFETY

## FEDERAL LAWS AND REGULATIONS

This section is intended to explain in broad terms the concept and effect of federal laws and regulations concerning employer and employee equipment operators. This section is not intended as a legal interpretation of the law and should not be considered as such.

### Employer-Employee Operator Regulations

U.S. Public Law 91-596 (The Williams-Steiger Occupational and Health Act of 1970) OSHA

#### This Act Seeks:

“...to assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources...”

#### DUTIES

Sec. 5 (a) Each employer-

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;

(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations and orders issued pursuant to this Act which are applicable to his own actions and conduct.

#### OSHA Regulations

OSHA regulations state in part: “At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee in the safe operation and servicing of all equipment with which the employee is, or will be involved.”

#### Employer Responsibilities:

To ensure employee safety during Tractor and Implement operation, it is the employer's responsibility to:

1. Train the employee in the proper and safe operation of the Tractor and Implement.
2. Require that the employee read and fully understand the Tractor and Implement Operator's manual.
3. Permit only qualified and properly trained employees to operate the Tractor and Implement.
4. Maintain the Tractor and Implement in a safe operational condition and maintain all shields and guards on the equipment.
5. Ensure the Tractor is equipped with a functional ROPS and seat belt and require that the employee operator securely fasten the safety belt and operate with the ROPS in the raised position at all times.
6. Forbid the employee operator to carry additional riders on the Tractor or Implement.
7. Provide the required tools to maintain the Tractor and Implement in a good safe working condition and provide the necessary support devices to secure the equipment safely while performing repairs and service.
8. Require that the employee operator stop digging if bystanders or passerbys come within 10 yards.

#### Child Labor Under 16 Years of Age

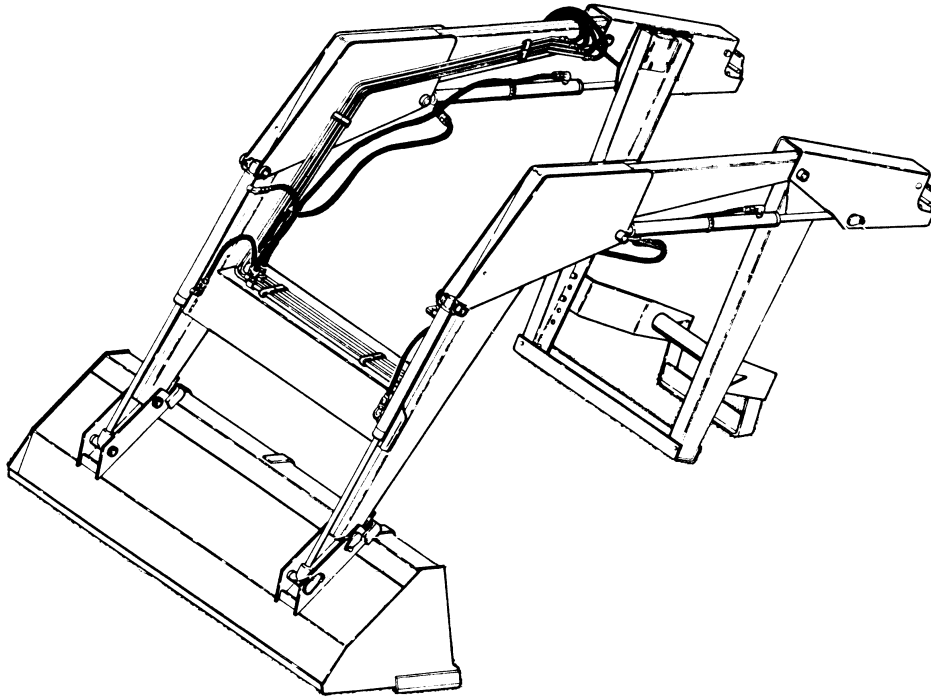
Some regulations specify that no one under the age of 16 may operate power machinery. It is your responsibility to know what these regulations are in your own area or situation. (Refer to U.S. Dept. of Labor, Employment Standard Administration, Wage & Home Division, Child Labor Bulletin #102.)



# **INTRODUCTION SECTION**

# INTRODUCTION

## INTRODUCTION



This manual provides operation, maintenance, assembly and parts identification for your new loader. Your loader has been designed to give many years of satisfactory service. Successful operation and long life of the loader depends on proper maintenance and operation. Please read this manual carefully and follow all instructions. Correct assembly, operation and maintenance will save you much time and expense. Also follow instructions included with loader mounting and hydraulic kits to insure that loader is installed correctly to tractor.



**NOTE: This safety alert symbol identifies important safety messages in this manual. Observe and follow all safety messages to prevent personal injury.**

Reference to left-hand and right-hand used in this manual refers to position of operator when seated in the operating position of loader.

If at any time you have a service problem with your loader or need new parts, contact your local dealer. Your dealer will need your loader model number and serial number to give you prompt efficient service.

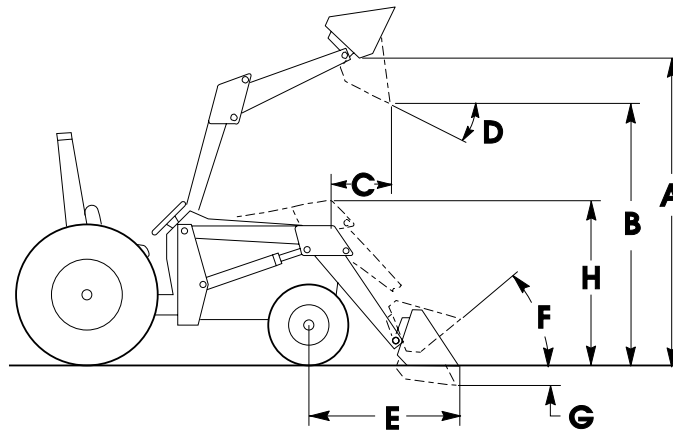
Parts orders must give complete description, correct part number, total amount required, model number, all necessary serial numbers, method of shipment and shipping address.

# INTRODUCTION

## SPECIFICATIONS

Specifications will vary with tractor, tire size, hydraulic system and bucket used. The specifications are given for a loader equipped with 72" HD material bucket operated with an average tractor hydraulic system of 20 GPM with engine operating at 2200 RPM and control valve relief setting of 2200 PSI.

Break-away Capacity . . . . .	3770#
Lift capacity at Full Height . . . . .	2240#
Raising Time . . . . .	4.5 sec.
Lowering Time . . . . .	3.2 sec.
Attachment Dumping Time. . . . .	2.7 sec.
Attachment Rollback Time . . . . .	1.9 sec.
Weight w/72" Heavy Duty Bucket. . . . .	1910#
Lift Cylinder: . . . . .	2.00 in
Stroke . . . . .	22.69 in.
Piston Diameter . . . . .	2.75 in.
Rod Diameter . . . . .	1.5 in.
Bucket Cylinder: . . . . .	2.25 in.
Stroke . . . . .	19.62 in.
Piston Diameter . . . . .	2.25 in.
Rod Diameter . . . . .	1.375 in.
(A) Maximum Clearance At Full Height. . . . .	119 in.
(B) Clearance with Bucket Dumped . . . . .	93 in.
(C) Reach at Maximum Height. . . . .	48 in.
(D) Maximum Dump Angle . . . . .	47°
(E) Reach with Attachment on ground . . . . .	80 in.
(F) Attachment Rollback Angle. . . . .	21°
(G) Digging Depth . . . . .	12 in.
(H) Overall Height in Carry Position . . . . .	77 in.



(Manufacturers estimated specifications and design subject to change without notice.)

# **ASSEMBLY SECTION**

# ASSEMBLY

## ASSEMBLY INSTRUCTIONS

### INSTALLING MOUNTING BRACKETS

Install all mounting brackets on the tractor according to instructions packed with mounting kit.

### INSTALLING LOADER

Install loader onto mounting brackets on tractor according to instructions packed with mounting kit.

### INSTALLING GREASE FITTINGS

Install 1/4 straight grease fittings (23) into the rod end of bucket cylinders.

**NOTE:** Grease fittings should point up ward when rod ends are attached to bucket.

### INSTALLING BUCKET

Attach bucket to the lift boom frame and bucket cylinders with 1-1/4 x 5-1/2 pins (9), 3/8 x 1" shoulder bolts (15) and lock nuts (20).

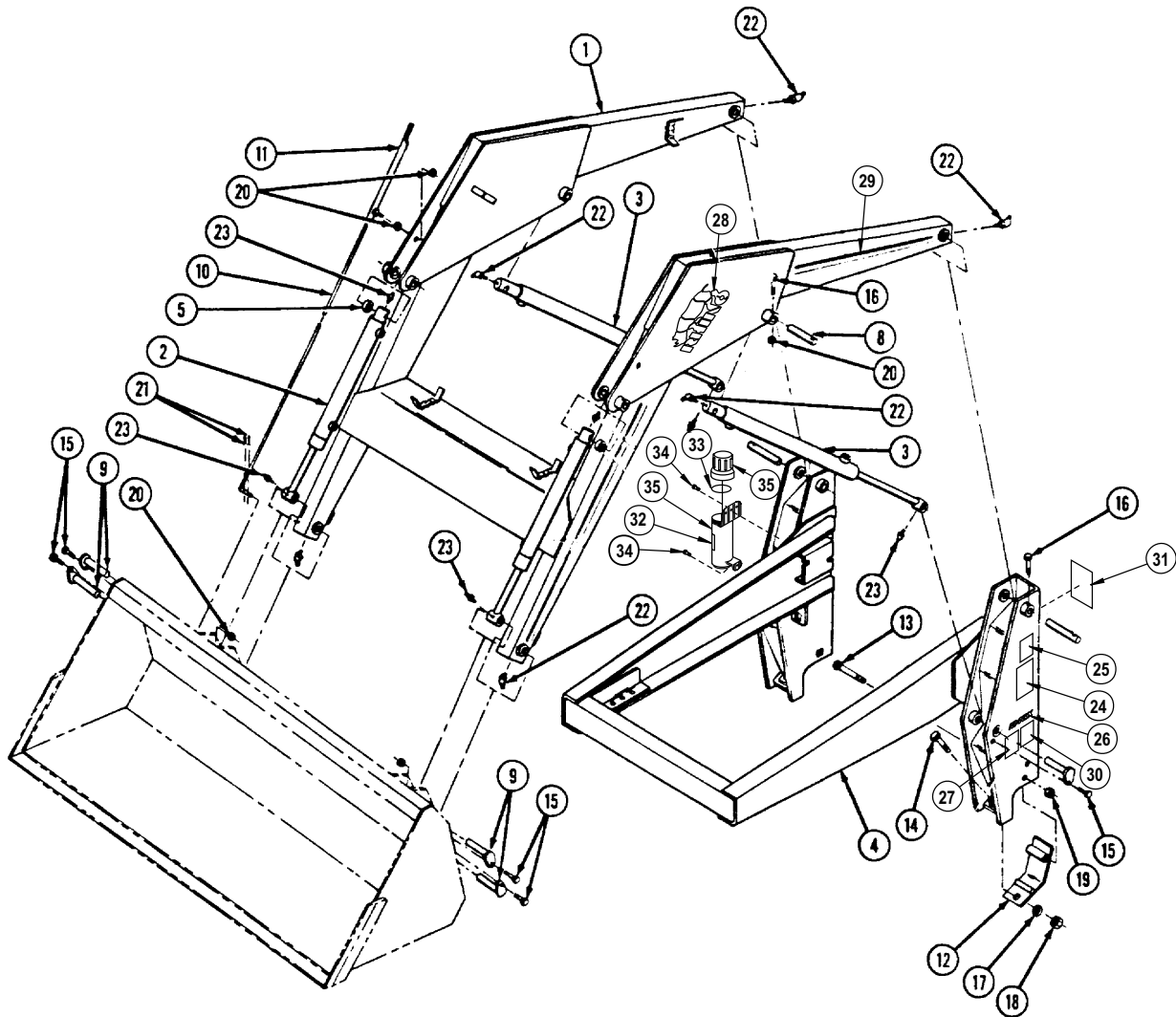
### INSTALLING BUCKET LEVEL INDICATOR

Attach indicator guide tube (11) to the knee plate on the right side of lift boom frame (1) with 3/8 lock nuts (20).

**NOTE:** Leave lock nuts loose enough so tube rotates freely.

Slide bucket level indicator rod (10) into the guide tube and attach the other end of rod to the bucket with 1/8 x 1" cotter pins (21).

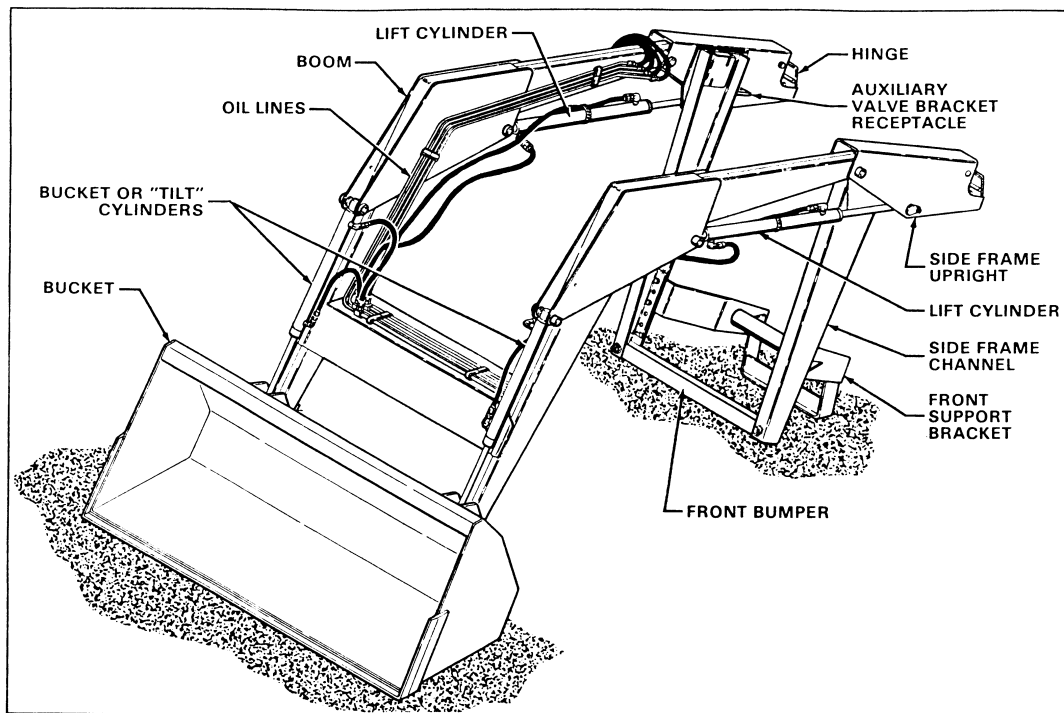
Locate tractor and loader on level surface. With the bottom of bucket resting on surface, cut off the excess rod (10) flush with the end of guide tube (11).



ASSEMBLY

# ASSEMBLY

## DISMOUNTING AND MOUNTING LOADER



### DISMOUNTING LOADER

**IMPORTANT:** The loader must be equipped with a bucket to dismount the loader from the tractor.

**NOTE:** The loader should be stored in a dry place.

1. Locate the tractor on firm level ground.
2. Level the bucket and lower it to the ground. Engage the tractor brakes and shut off the tractor engine. Move the lift control lever back and forth several times to relieve pressure in the lift cylinders.
3. Loosen the 3/4 x 3-1/2 cap screws which clamp the hinges closed around the mid mounting tubes. Remove cap screws, washers and lock nuts. Place washer onto cap screw, and holding hinge open as wide as possible, insert cap screw through the hole provided in side frame upright so hinge will be blocked open. The lock nut can be stored by fastening it onto the extra threads provided on the hinge carriage bolt.
4. Remove the rubber strap which secures the hoses to the loader front support bracket. Remove any tie straps which attach hoses to tractor or brackets.
5. Start the tractor engine and release tractor brakes. Lower loader boom slightly as necessary to distribute the weight of the loader equally between the front

mounting bracket and mid mounting brackets. This can also be accomplished by using the boom float position if the valve used to control the lift cylinders is so equipped. Move the tractor backwards to disengage front support bracket tube from front mounting bracket channel. Activate lift control lever to gently lower loader front support bracket to the ground. Continue rotating loader side frames off mid mounting brackets until hinges clear mid mounting tubes. Slowly back tractor out of loader while rotating loader side frames until lift cylinders are fully extended.

**NOTE:** If the loader is being stored for an extended period of time (once a month or more) retract the lift and bucket cylinders to their fully collapsed position. The tractor may have to be moved forward or backward while collapsing loader to maintain slack in hydraulic hoses.

Engage tractor brakes and shut off tractor engine.

6. Move lift and bucket control levers back and forth several times to relieve pressure on the lift and bucket cylinders. Disconnect quick couplers between the loader and tractor. Hang hoses over the side frame for storage. If tractor is equipped with the optional 1 - lever auxiliary valve, also remove the valve support assembly from the guide tube on right mid mounting bracket. Slide valve support assembly into bracket provided on underside of right side frame channel.

# ASSEMBLY

## PREPARING STORED LOADER FOR MOUNTING

If the loader has been completely collapsed for long-term storage, it is necessary to expand the loader first, before it can be mounted on the tractor. Follow the instructions below which apply to your loader, depending on what valve is used to control the loader, to prepare the loader for mounting.

### FOR LOADER PLUMBED TO TRACTOR REMOTE VALVE

1. Slowly back the tractor up to the loader until hoses will reach from loader to tractor remote couplers. Engage the tractor brakes and shut off the tractor engine.
2. Making sure quick couplers are clean, connect quick couplers between the tractor and loader. Match color coded bands when connecting couplers.
3. Start the tractor engine and release tractor brakes. Operate the lift control valve to extend the lift cylinders as far as possible.

**NOTE:** *The tractor may have to be moved backward or forward while extending lift cylinders to maintain slack in hydraulic hoses.*

4. Once the lift cylinders are fully extended, shut off the tractor engine and engage the tractor brakes. Move the loader control levers back and forth to relieve pressure in the cylinders, then disconnect the quick couplers.
5. Start the tractor engine, release the tractor brakes slowly drive the tractor up to loader

### FOR LOADER PLUMBED TO OPTIONAL 1-LEVER AUXILIARY VALVE

1. Slowly drive the tractor up to the loader until hoses will reach from 1-lever auxiliary valve to tractor. Engage tractor brakes and shut off tractor engine.
2. Reinstall valve support assembly into the valve support guide tube. Connect quick couplers by matching color coded bands.

**NOTE:** *Make sure quick couplers are clean.*

3. Start the tractor engine and release tractor brakes. Operate lift control to extend the lift cylinders as far as possible.

**NOTE:** *The tractor may have to be moved backward or forward while extending lift cylinders to maintain slack in hydraulic hoses.*

## MOUNTING PROCEDURE

The mounting procedure is basically the reverse of dismounting

1. Slowly drive the tractor up to loader until hoses will reach from the loader to the tractor. Engage the tractor brakes and shut off tractor engine.
2. Connect quick couplers between tractor and loader, matching color coded bands.

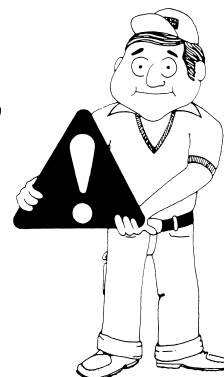
**NOTE:** *Make sure quick couplers are clean, and make sure hinges are blocked open wide by 3/4 x 3-1/2 cap screws in hole provided in each side frame upright.*

3. Start tractor engine and release tractor brakes. Slowly drive the tractor ahead while activating lift control lever to retract lift cylinders. Position tractor so hinges hook mid mounting bracket tubes as loader side frame uprights rotate.
4. Put the tractor in neutral. Retract the lift cylinders bringing the side frame channels up so front support bracket tube contacts front mounting bracket channel. Move the tractor ahead so front support bracket tube engages in front mounting bracket channel and loader side frame uprights seat properly on mid mounting bracket tubes (with no gap between upright cut-out and front of tube). Engage tractor brakes and shut off tractor engine.
5. Remove 3/4 x 3-1/2 cap screw with washer which blocked hinge open and remove elastic lock nut from extra threads on hinge carriage bolt. Clamp hinge of upright around the mid mounting tube. Insert 3/4 x 3-1/2 cap screw down through upright and hinge and fasten washer and elastic nut onto cap screw outside of hinge.

**IMPORTANT:** *Be sure to use ELASTIC lock nut to clamp hinge. Tighten elastic lock nut against hinge securely, but to no more than 125 ft-lbs. torque.*

6. Hook the rubber strap from hoses to loader support bracket. Reinstall reusable tie straps.

**"REMEMBER  
THIS SAFETY  
ALERT  
SYMBOL !!!"**



# **OPERATION SECTION**



# OPERATION

## PREPARING TRACTOR

Before operating loader, for optimum stability, additional weight should be added to rear of tractor with rear wheel weights or liquid ballast. Refer to your tractor operator's manual for weighting information.

The tractor rear wheels should be moved to the tractor manufacturer's widest recommended settings to increase the stability of the tractor.

## OPERATING LOADER

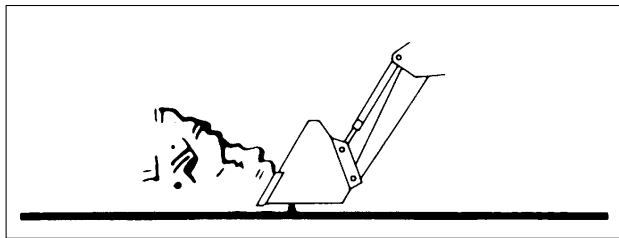
Loader should be operated with tractor engine running at 1500-1800 RPM. Excessive speeds are dangerous and may cause bucket spillage and unnecessary strain on the tractor and loader.

When operating in temperatures below 30° F., run the tractor engine below 1200 rpm until oil temperature exceeds 30° F.

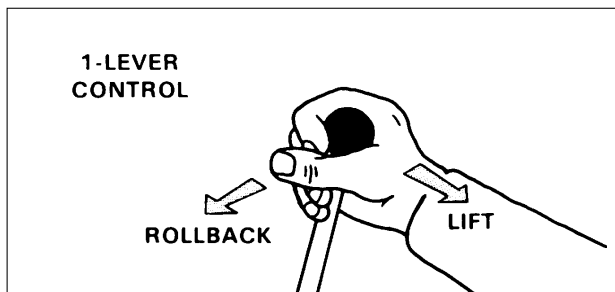
The following text and illustrations offer suggested loader and tractor operating techniques.

## FILLING THE BUCKET

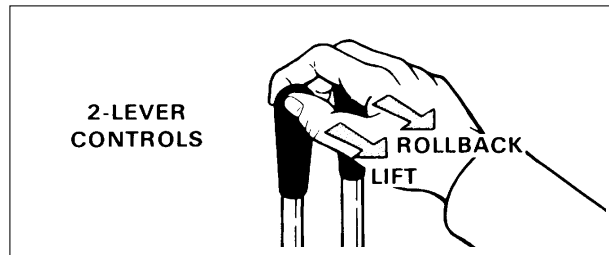
Approach and enter the pile with a level bucket.



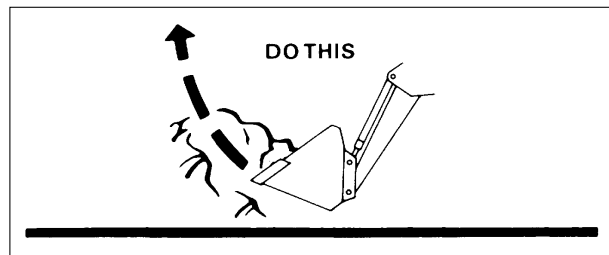
Loaders with 1-lever control, ease lever back and away from you to lift and roll back bucket.



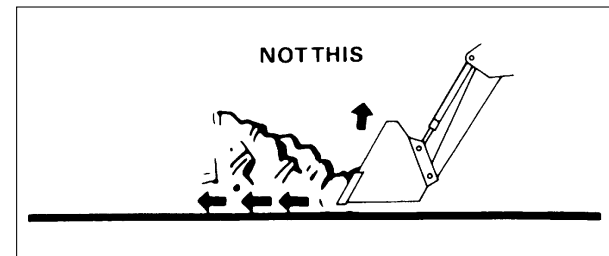
Loaders with 2-lever controls, ease both levers back to lift and roll back bucket.



Lift and roll back of bucket will increase efficiency because...



... A level bucket throughout the lifting cycle resists bucket lift and increases breakaway effort.

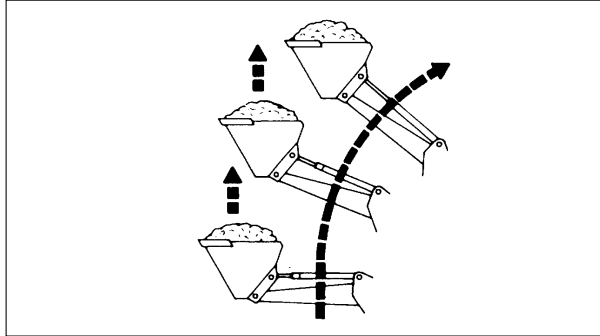


**NOTE:** Do not be concerned if the bucket is not completely filled during each pass. Maximum productivity is determined by the amount of material loaded in a given period of time. Time is lost if two or more attempts are made to fill the bucket on each pass.

# OPERATION

## LIFTING THE LOAD

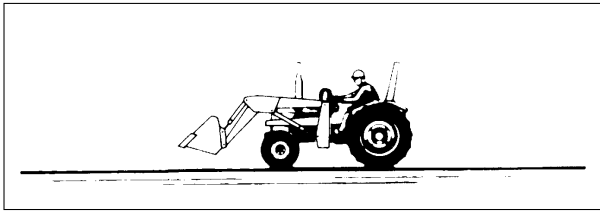
When lifting the load, keep the bucket positioned to avoid spillage.



**CAUTION:** Do not attempt to lift loads in excess of loader capacity.

## CARRYING THE LOAD

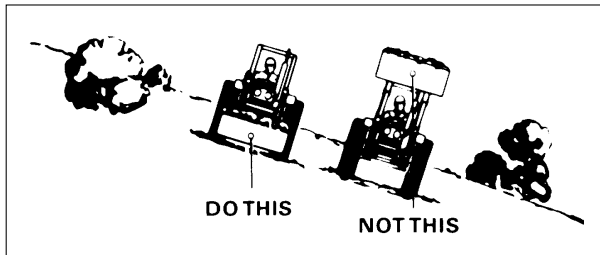
Position bucket just below tractor hood for maximum stability and visibility, whether bucket is loaded or empty.



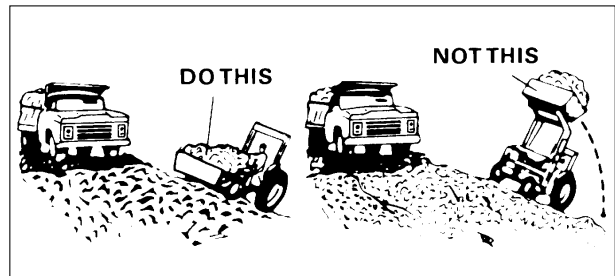
Use extreme care when operating loader on a slope, keep bucket as low as possible. This keeps center of gravity low and will provide maximum stability.



**CAUTION:** Operating loader on a hillside is dangerous. Extreme care is recommended. Keep bucket as low as possible.

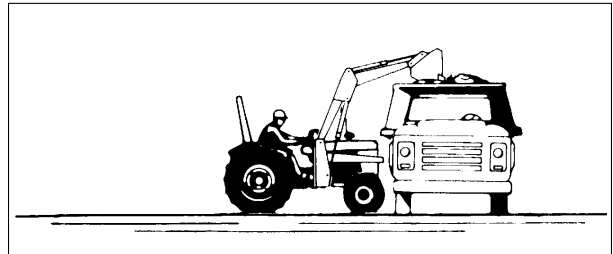


When transporting the load, keep bucket as low as possible, to avoid tipping, in case a wheel drops in a rut.



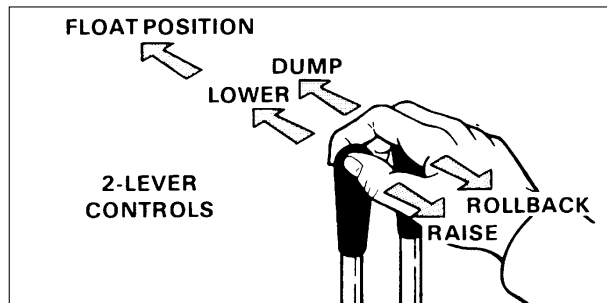
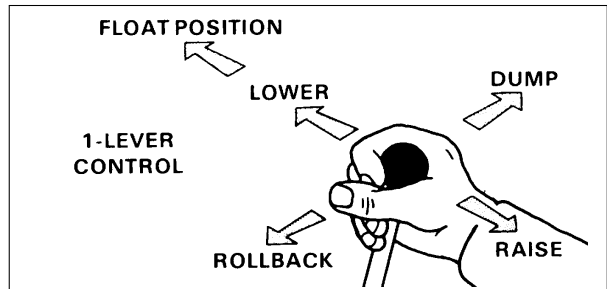
## DUMPING THE BUCKET

Lift bucket high enough to clear side of vehicle. Move tractor in as close as possible to side of vehicle, then dump bucket.



## LOWERING THE BUCKET

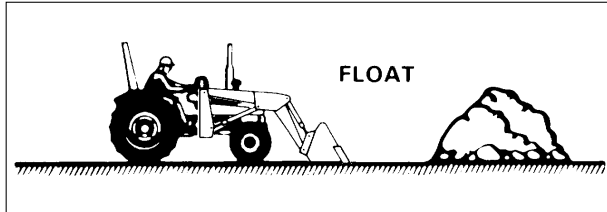
After bucket is dumped, back away from vehicle while lowering and rolling back bucket.



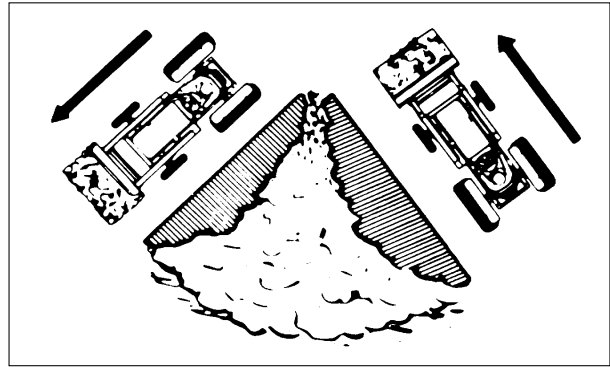
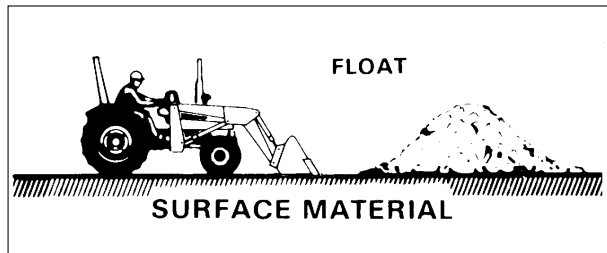
# OPERATION

## OPERATING WITH FLOAT CONTROL

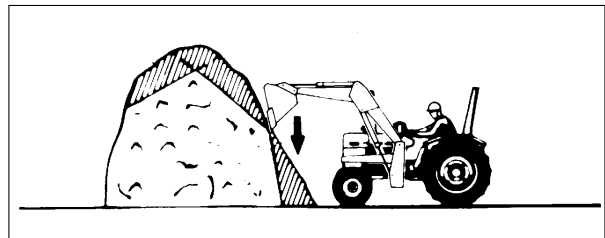
During hard surface operation, keep bucket level and put lift control in float position to permit bucket to float on working surface. If hydraulic down pressure is exerted on bucket, it will wear faster than normal.



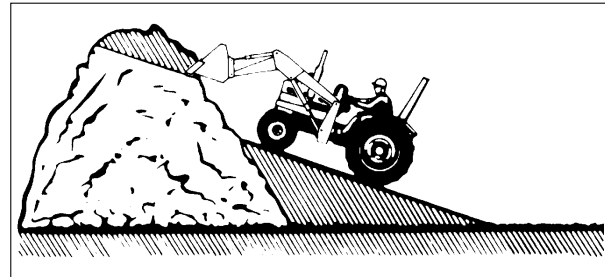
Float will also prevent mixing of surface material with stockpile material. Float position will reduce the chance of surface gouging when removing snow or other material, or when working with a blade.



Sidecutting is a good technique for cutting down a big pile.



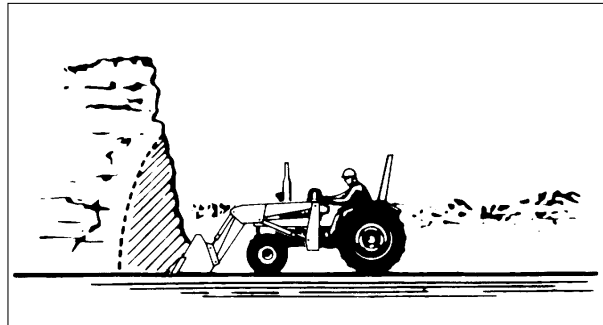
If the pile sides are too high and liable to cause cave-in, use loader to break down the sides until a slot can be cut over the top.



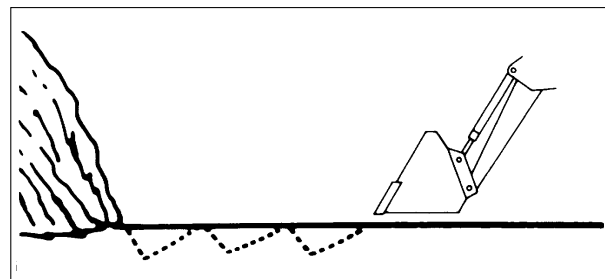
Another method for large dirt piles is to build a ramp approach to the pile.

## LOADING FROM A BANK

Choose a forward gear that provides sufficient ground speed for loading.



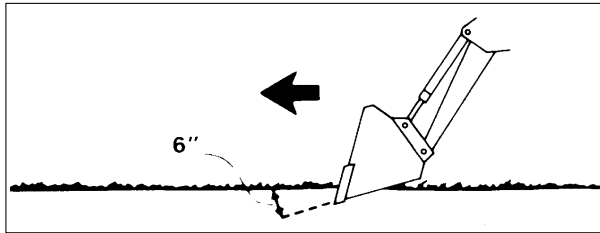
Exercise caution when undercutting high banks. Dirt slides can be dangerous. Load from as low as possible for maximum efficiency. Loader lift and breakaway capacity diminish as loading height is increased.



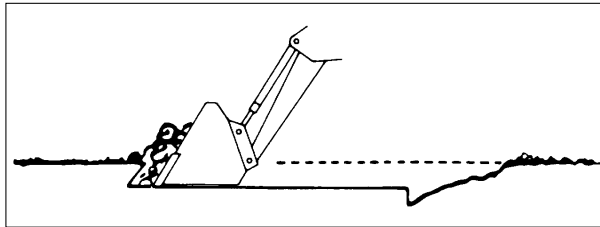
It is important to keep the bucket level when approaching a bank or pile. This will help prevent gouging the work area.

# OPERATION

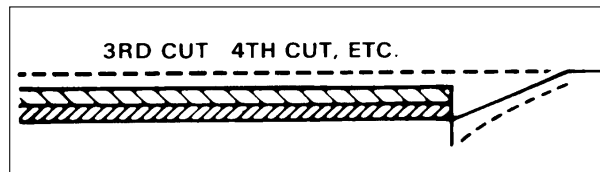
## PEELING AND SCRAPING



Use a slight bucket angle, travel forward and hold lift control forward to start the cut. Make a short 5 to 8 foot angle cut and break out cleanly.

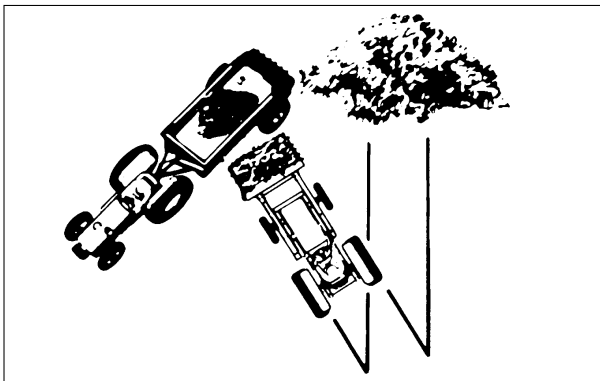


With bucket level, start a cut at notch approximately 2 inches deep. Hold depth by feathering bucket control to adjust cutting lip up or down. When front tires enter the notch, adjust lift cylinder to maintain proper depth.

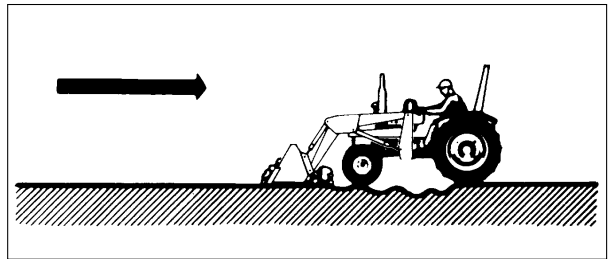


Make additional passes until desired depth is reached. During each pass, use only bucket control while working depth. This will allow you to concentrate on controlling bucket angle to maintain a precise cut.

## LOADING LOW TRUCKS OR SPREADERS FROM A PILE

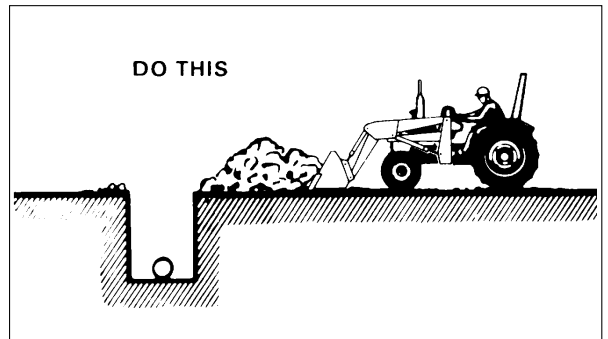


For faster loading, minimize angle of turn and length of run between pile and spreader.

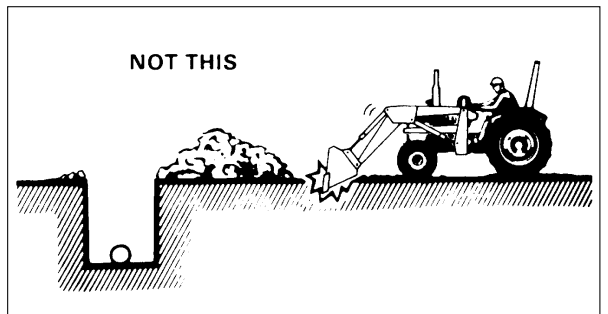


Backgrade occasionally with a loaded bucket to keep working surface free of ruts and holes. Also, hold lift control forward so full weight of bucket is scraping ground.

## BACKFILLING



Approach pile with a level bucket.

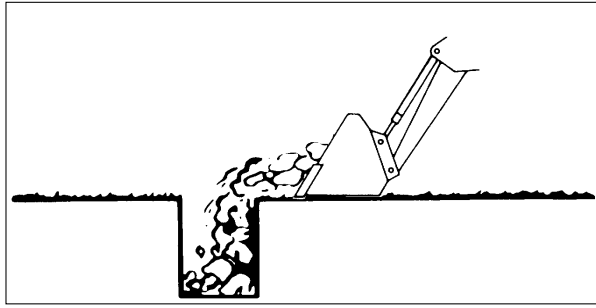


Poor methods actually move no more dirt and make it more difficult to hold a level grade.

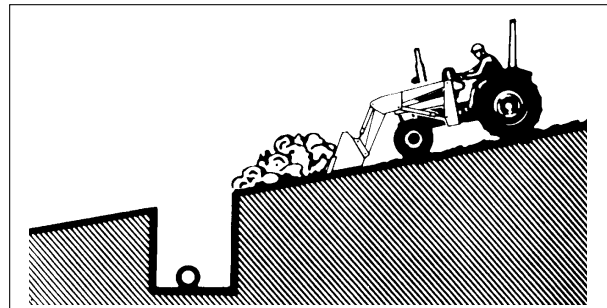
Do not use bucket in dumped position for bulldozing. This method, shown above, will impose severe shock loadings on dump linkage, bucket cylinder and tractor.

OPERATION

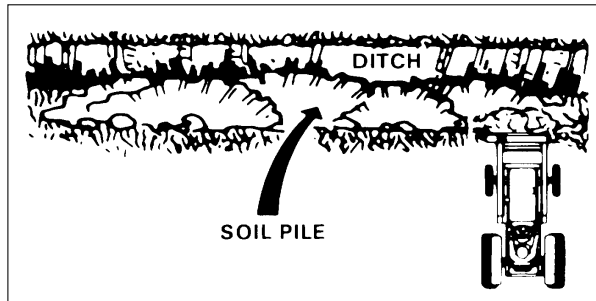
# OPERATION



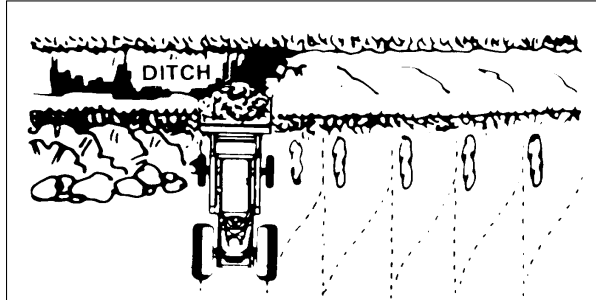
Leave dirt in bucket. Dumping on each pass wastes time.



Pile dirt on high side for easier backfilling on a slope.



Operate at right angles to ditch. Take as big a bite as tractor can handle without lugging down.



Leave dirt which drifts over side of bucket for final cleanup.

## HANDLING LARGE HEAVY OBJECTS

### DANGER

1. Using front end loaders for handling large heavy objects such as large round or rectangular bales, logs and oil drums is not recommended.
2. Handling large heavy objects can be extremely dangerous due to:
  - *Danger of rolling tractor over.*
  - *Danger of up-ending tractor.*
  - *Danger of object rolling or sliding down loader arms onto operator.*
3. If you must perform above work, protect yourself by:
  - *Never lifting load higher than necessary to clear ground when moving.*
  - *Ballasting tractor rear to compensate for load.*
  - *Never lifting large objects with equipment that does not have an anti-rollback device.*

OPERATION



**SAFE OPERATION  
IS YOUR BEST PROTECTION  
AGAINST ACCIDENTS**

# OPERATION

## OPERATING GRAPPLE FORK

Operation of your tractor and loader with grapple fork option requires some same basic considerations as operation with a bucket, plus two new requirements: you now have to operate a grapple fork while already operating your tractor and loader; and you must also take into account additional space requirements (added length and height) needed because of attached grapple fork.

## INTENDED USE

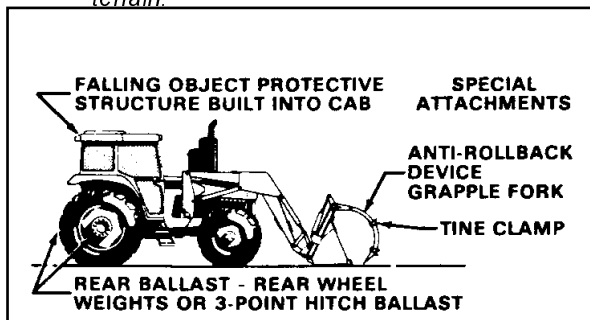
Use of this loader without special attachments for handling large heavy objects such as large round or rectangular bales, logs and oil drums is **NOT RECOMMENDED**.

Handling large heavy objects can be extremely dangerous due to:

- *Danger of rolling tractor over.*
- *Danger of upending tractor.*
- *Danger of objects rolling or sliding down loader arms onto operator.*

If you must perform any work listed above, protect yourself by:

- *Never lift load higher than necessary to clear ground when moving.*
- *Ballast tractor rear to compensate for load.*
- *Never lift large objects with equipment that does not have an anti-rollback device.*
- *Move slowly and carefully, avoiding rough terrain.*

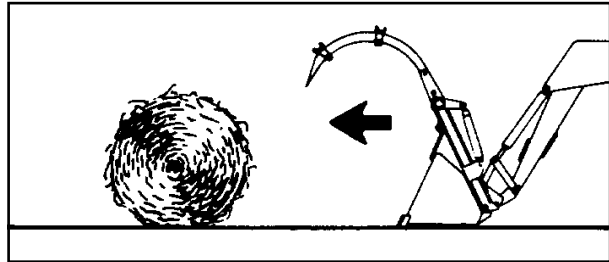


Using special attachments as shown, and exercising caution, your loader can be used to handle large round or rectangular bales and loose bulky materials like hay and silage. Do not attempt to use loader to handle logs, fertilizer bags or liquid containers since such use is **NOT RECOMMENDED**.

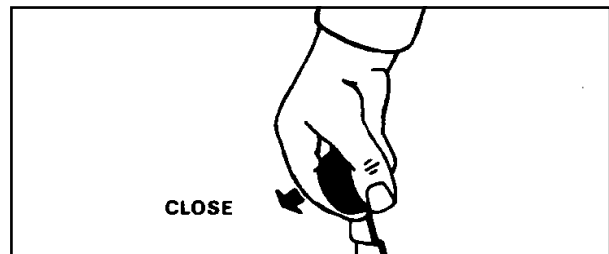
**NOTE:** *It is recommended to use both tine clamps if your grapple fork is to be used for handling round or rectangular bales. Using only one clamp may work better for loose hay or silage, allowing tines to penetrate better. Additional tine clamps are optional. Keep each grapple fork tine clamp securely fastened to grapple fork tines at all times.*

## GRASPING ROUND BALES

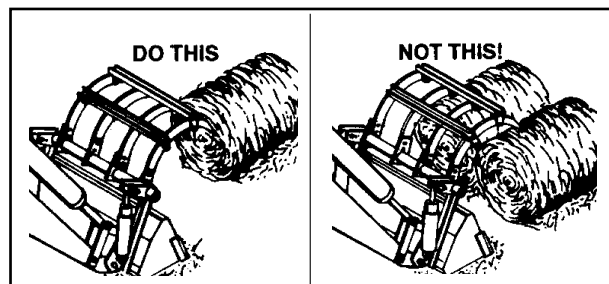
Approach bale with grapple fork open and bucket level. Use loader float position if bale is on ground.



Ease valve control lever for grapple fork forward to close grapple fork around bale.

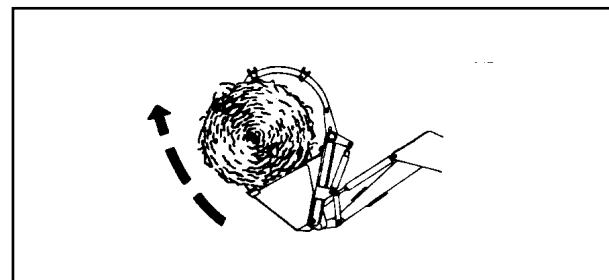


**NOTE:** *While large round bales are best grasped as shown above, they may also be grasped from either side if necessary. DO NOT ATTEMPT TO LIFT MORE THAN ONE LARGE ROUND BALE AT A TIME as this can cause overloading of loader or tractor or cause unstable conditions.*



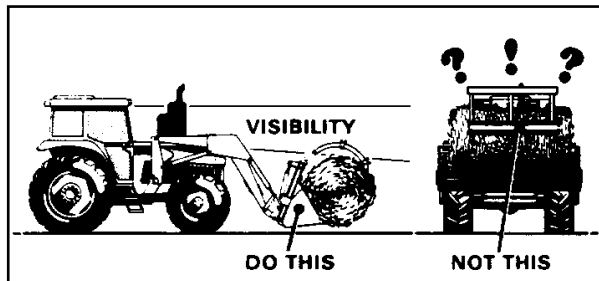
## LIFTING AND CARRYING LOAD

Ease both loader control levers back to lift and roll bucket back.



# OPERATION

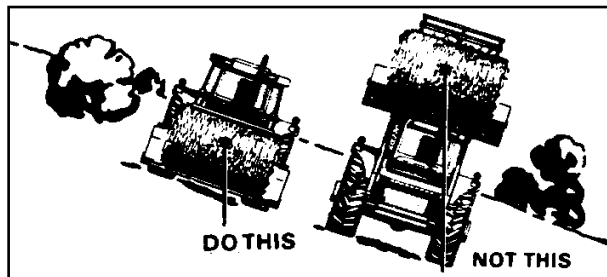
Position bucket just below level of tractor hood for maximum stability and visibility whether bucket is loaded or empty.



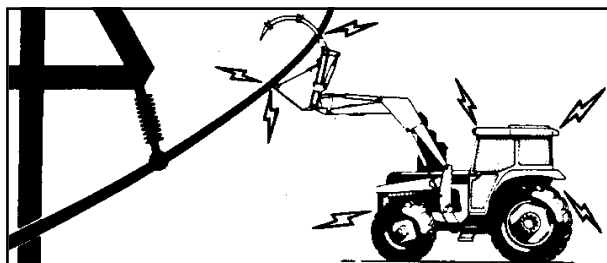
Use extreme care when operating loader on a slope. Carry load as low as possible. This keeps center of gravity for bale, tractor and loader low and will provide maximum tractor stability.



**CAUTION:** *Operating a loader on a hillside is dangerous. Extreme care is recommended to avoid overturns.*



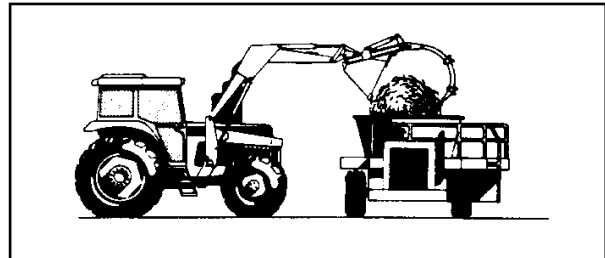
Even on level ground, transport bucket and load as low as possible to avoid tipping in case a wheel drops in a rut and to avoid power lines.



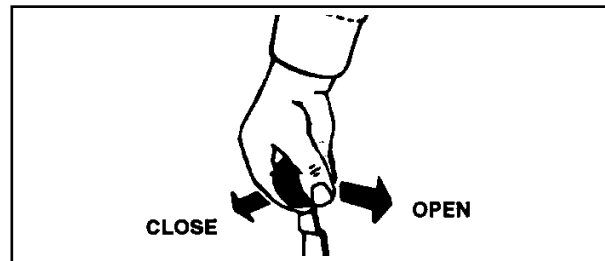
**WARNING:** *Keep bucket, grapple fork and loader boom clear of overhead lines. Allowing loader boom or any attachments to contact overhead power lines may electrify entire tractor and electrocute (kill) operator.*

## LOADING INTO TUB GRINDER

Lift bucket high enough to clear tub grinder sides. Move tractor toward tub grinder to position load near center. Extend bucket cylinders to position bucket in dump attitude.



Gradually open grapple fork tines, allowing material to drop into tub grinder. For round bales it may be necessary to gradually set bale into tub grinder to avoid shock loading tub grinder due to bale weight and to avoid sudden load on grinder mechanism.

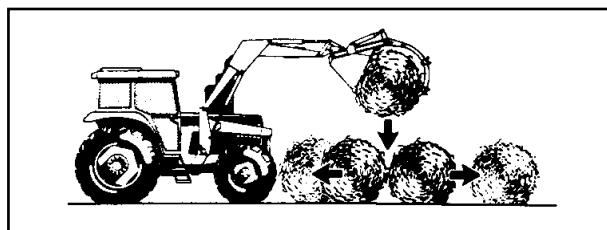


Roll bucket back, close grapple fork and back tractor away from tub grinder, then lower loader boom after dumping.

## STACKING BALES

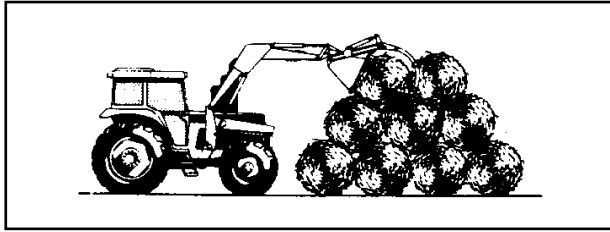


**WARNING:** *Because of size and weight of large bales, extreme care must be taken in handling them. Be aware of forces acting on stacked bales due to gravity and keep workers far from zones of potential hazard from shifting or falling bales. DO NOT ALLOW BYSTANDERS!*

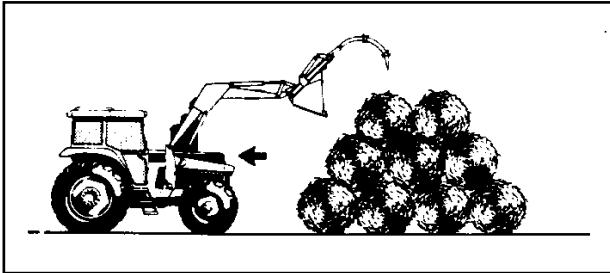


# OPERATION

Use loader and grapple fork to gently position bale on stack, then release bale while removing bucket and fork.

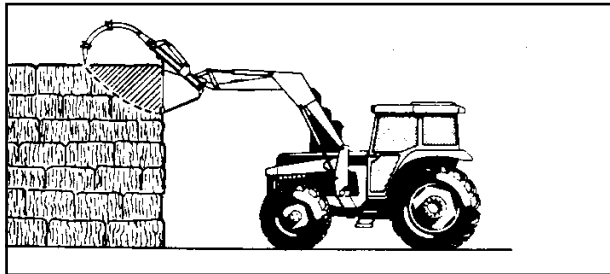


Slowly back tractor away from stack.



## LOADING FROM A STACK, BUNKER SILO OR PIT SILO

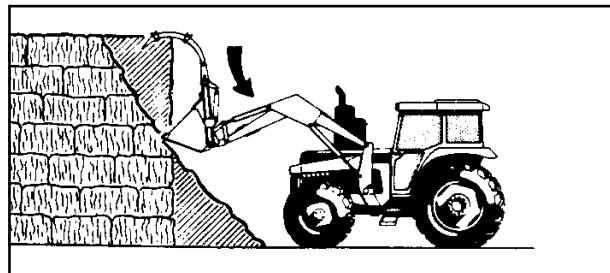
Choose a forward gear that provides sufficient ground speed for loading.



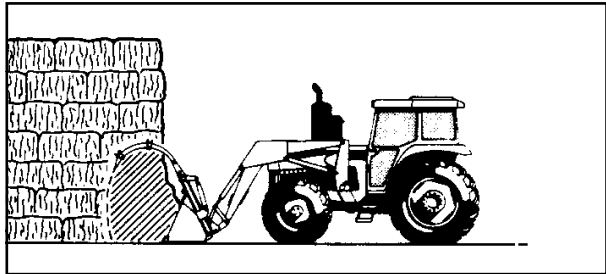
Touch pile as near as possible to top with bucket positioned in dump attitude and grapple fork open. Close grapple fork while maneuvering bucket to grasp loose material.



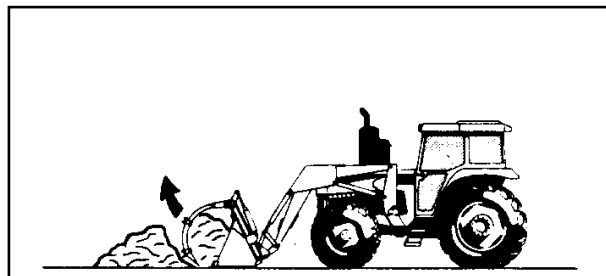
**CAUTION:** Loader lift and break-away capacity diminish as loader height is increased. Care must be taken not to grasp more material than your loader can safely support.



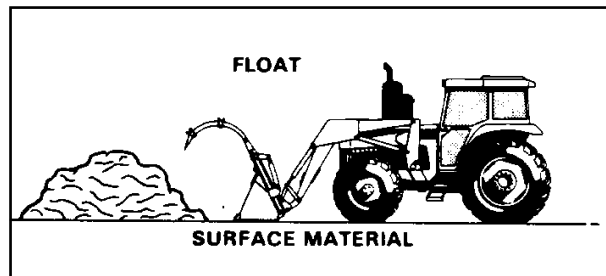
An alternative method is to use your loader and grapple fork to knock material down from top of pile so it can be loaded from ground.



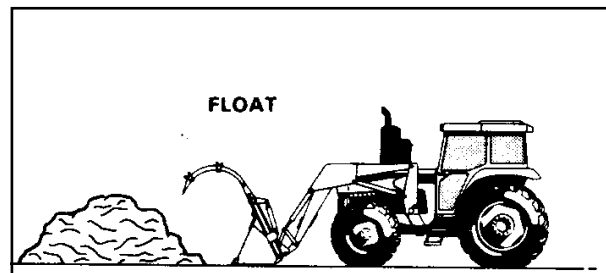
Exercise caution when undercutting a high pile. Avalanching material can be dangerous.



When loading material from ground, keep a level bucket and use lift control float position. If hydraulic down pressure is exerted on a bucket, it will wear faster than normal. Keep bucket level when approaching pile.



Keeping a level bucket and using loader float will reduce surface gouging and mixing surface material with stockpile material.



When a sufficient amount of material has accumulated in front of bucket, close grapple fork to grasp material and curl bucket back.



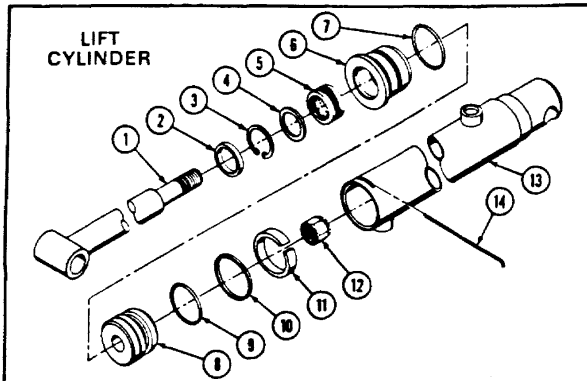
# **MAINTENANCE SECTION**

# MAINTENANCE

## CYLINDER SERVICE

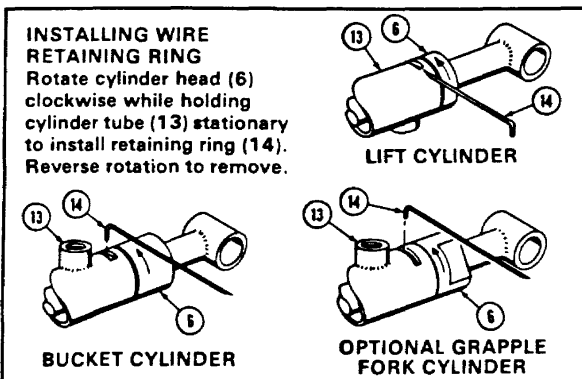
The cylinders are designed to be reliable and easy to service. If a cylinder should malfunction during the warranty period, return the complete cylinder assembly, without disassembling, to your authorized service department or contact your authorized service department for instructions. Unauthorized disassembly of a cylinder in the warranty period will VOID WARRANTY.

The following is an outline of the procedure for disassembling and reassembling the cylinders.



### CYLINDER DISASSEMBLY

1. Hold cylinder tube (13) stationary and rotate cylinder head (6) so wire ring (14) will thread out through the slot in the cylinder tube.

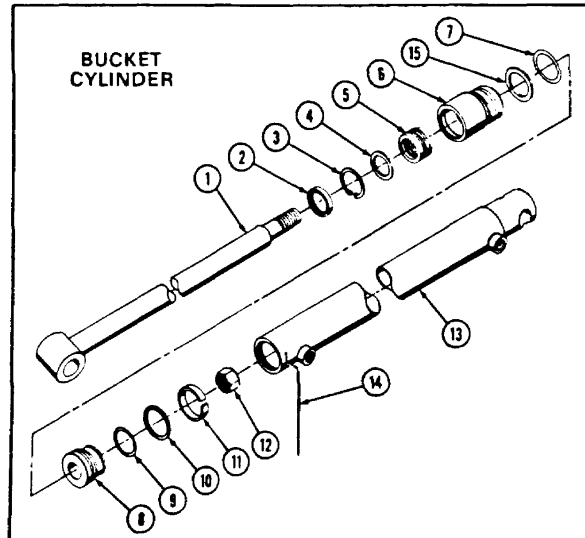


2. Pull shaft (1) with all assembled parts out of cylinder tube (13).

**NOTE:** Resistance will be felt until piston seal (10) slides over the wire retaining ring groove.

3. Remove 1" elastic lock nut (12) from end of shaft and slide cylinder piston (8), and cylinder head (6) off the shaft.
4. Remove piston wear ring (11), piston seal (10) and o-ring (9) from outside grooves of piston (8).
5. Remove wiper seal (2), snap ring (3), reinforcing washer (4), v-pack set (5) from inside of cylinder head and o-ring (7) from groove on outside of head.

For bucket cylinders, also remove back-up washer (15) from groove on outside of head.



6. Clean all parts, including cylinder tube, in a suitable cleaning solvent, then use air pressure to blow any dirt or excess solvent from all parts.

7. Examine all parts for wear or damage and replace, if necessary.

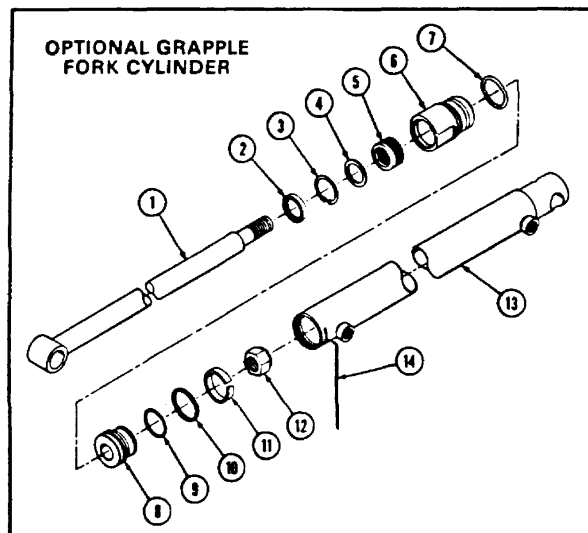
### CYLINDER REASSEMBLY

1. Place new v-pack set (5) in head (6).

**NOTE:** Be careful not to damage seals, packings and o-rings on the edges or holes in cylinder tube. Inspect and remove burrs and sharp edges if necessary before reassembling.

**NOTE:** Lips on v-pack must face toward the inside of head.

2. Place reinforcement washer (4) on top of v-pack set (5) and force down below snap ring groove.



# MAINTENANCE

## CYLINDER REASSEMBLY (Continued)

3. Install snap ring (3) into snap ring groove.

**NOTE:** *Rounded outside edge of snap ring must face inward and snap ring must be firmly seated in groove.*

4. Install wiper seal (2) with lip of seal facing out and flush with top of cylinder head (6).
5. Place o-ring (7) in groove on outside of head (6). Also place back-up washer (15) in groove of head for bucket cylinders.
6. Remove sharp edges on outer edge of threaded end of shaft (1). Lubricate wiper seal (2) and v-packing (5) in head and carefully slide head (6) onto shaft.
7. Place o-ring (9), piston seal (10) and piston wear ring (11) in grooves on outside of piston (8).

**NOTE:** *For easier installation, place piston seal (10) in 120°F water to warm seal.*

8. Slide piston (8) onto threaded end of shaft and install 1" elastic lock nut (12) to 375 ft. lbs.
9. Lubricate piston wear ring (11) and piston seal (10) on piston (8) and o-ring (7) on head (6) and carefully slide piston and head into cylinder tube (13).
10. For lift cylinders, insert wire retaining ring (14) into slot in cylinder tube (13). Simultaneously apply pressure to wire ring and turn cylinder head (6) to thread wire ring into groove. For bucket cylinders and optional grapple fork cylinder, turn cylinder head (6) until hole in wire ring groove appears in slot in cylinder tube (13). Insert hook end of wire ring (14) into hole and turn cylinder head to thread wire ring into groove.

## CONTROL VALVE SERVICE

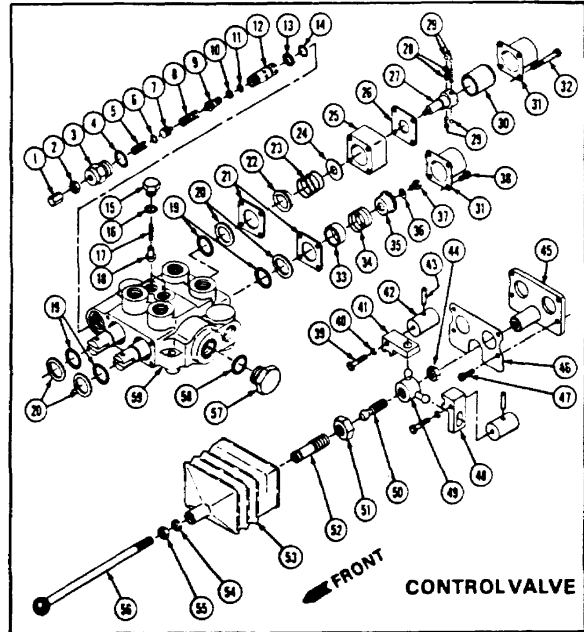
The optional Prince control valve is designed to be reliable and easy to service. The valve body and spools are not sold as separate repair items, because the body is factory honed to fit the spools. If the valve should malfunction during the warranty period, return the complete valve assembly, without disassembling, to your authorized service department or contact your authorized service department for instructions. Unauthorized disassembly of the valve in the warranty period will VOID WARRANTY.



**WARNING:** *The valve has a valve relief setting pre-set at the factory. Tampering with this setting can cause **SERIOUS INJURY** to the operator and **DAMAGE** to the tractor or loader. Unauthorized adjustments or service to the valve relief will **VOID WARRANTY** of both loader and tractor. If adjustments or service to the valve relief are required during the warranty period, an authorized service department must be consulted for authorization.*

If repairs to the valve are ever necessary, follow the following procedures:

**NOTE:** *It is advisable to mark or tag all hoses and parts before disassembling, so they can be reinstalled properly.*



## VALVE SPOOL SEAL REPLACEMENT

**IMPORTANT:** *Replacement of spool seals is a delicate operation and must be carefully performed to prevent damage to new seals or scoring of spools or spool bores. If spools or spool bores are scored or damaged in any way, complete valve must be replaced, because valve body and spools are not sold separately.*

1. Slide molded bellows (53) off of retaining plate (46). Tap spring pins (43) out of spool adaptors (42). Remove four screws (47) securing valve handle assembly to the valve body (59).
2. Remove screws (38) and end cap (31) from valve body (59). Remove cap screw (37), washer (36), stop cup (35), centering spring (34), stop cup (33) and retainer plate (21) from valve spool.
3. Remove screws (32) and end cap (31) from valve body (59). Slowly remove float sleeve (30) while cupping hand around sleeve to catch detent balls (29) and springs (28). Remove detent retainer (27), retainer plate (26), float spacer (25), washer (24), centering spring (23), stop cup (22) and retainer plate (21) from valve spool.
4. Push spools into valve body (59) from the rear until rear spool seals (20) and o-rings (19) are exposed. Remove seals and o-rings by using a wire hook and screwdriver. Push spools back into valve body from the front until front spool seals and o-rings are exposed. Remove front spool seals and o-rings with wire hook and screwdriver.

# MAINTENANCE

## VALVE SPOOL SEAL REPLACEMENT (Continued)

5. Clean all parts with a suitable cleaning solvent and then use air pressure to blow any dirt or excess solvent from all parts. Examine all parts for wear damage and replace if necessary.
6. Lubricate all o-rings and spools with oil to prevent DAMAGE when assembling.
7. Lubricate all detent and spring centering parts with a light coat of grease before assembling.
8. Reassemble all parts in reverse order of disassembly.

## RELIEF VALVE

**NOTE:** *The relief valve and load check sections of control valve may be removed separately to clean, inspect or replace parts without removing valve spools.*

1. Remove retainer plug (3) from valve body. Unscrew relief cartridge (12) from retainer plug (3). Remove spring (8), spring retainer (7) and piston (9).

**IMPORTANT:** *Do not remove acorn nut (1), jam nut (2) and set screw (5) from retainer plug (3). See WARNING page 17.*

2. Remove o-ring (4) from retainer plug (3) and o-ring (6) from spring retainer (7). Remove o-ring (11) and backup (10) from piston (9). Remove o-ring (14) and backup (13) from relief cartridge (12).
3. Remove load check plugs (15), springs (17) and load check poppets (18). Remove o-rings (16) from load check plugs (15).
4. Clean all parts with a suitable cleaning solvent and then use air pressure to blow any dirt or excess solvent from all parts. Examine all parts for wear damage and replace if necessary.
5. Lubricate all o-rings and seals with oil to prevent DAMAGE when assembling.
6. Reinstall load check poppets (18), springs (17), o-rings (16) and load check plugs (15) into top of valve body (59).
7. Install o-ring (4) onto retainer plug (3) and o-ring (6) onto spring retainer (7). Install backup (10) and o-ring (11) onto piston (9). Install backup (13) and o-ring (14) onto relief cartridge (12).
8. Install piston (9) and spring (8) into relief cartridge (12) and spring retainer (7) into retainer plug (3). Install relief cartridge into retainer plug and torque 10-20 ft. lbs.
9. Install retainer plug (3) into valve body (59) and tighten.

## ONE HANDLE CONTROL LEVER

1. Loosen nut (55) and unscrew handle (56). Remove molded bellows (53).
  2. Loosen jam nut (51) and unscrew handle adaptor (52) from center pivot (49).
  3. Remove screws (39), lock washers (40) and slide blocks (41 & 48) from spool adaptors (42).
  4. Loosen jam nut (44) and unscrew pivot stud (50) by inserting a standard screwdriver through hole on back side of base plate (45).
  5. Clean all parts with a suitable cleaning solvent and then use air pressure to blow any dirt or excess solvent from all parts. Examine all parts for wear and damage and replace if necessary.
  6. Grease ball and socket joints on slide blocks (41 & 48), center pivot (49), pivot stud (50) and handle adaptor (52). Grease the slot on slide block (48).
  7. Fasten top slide block (41) to spool adapter (42) on relief side of valve with 1/4 x 1-1/2 cap screw (39) and lock washer (40). Fasten side slide block (48) to spool adapter (42) with 1/4 x 1-1/2 cap screw (39) and lock washer (40). Top slide block (41) must be in the slot of side slide block (48).
  8. Position center pivot (49) so the spherical ends are in the holes of slide blocks (41 & 48). Insert pivot stud (50) through center pivot (49) and install jam nut (44). Install pivot stud (50) into base plate (45) about 1/2 inch. Do not tighten jam nut (44).
  9. Install jam nut (51) onto handle adaptor (52). Install handle adaptor (52) into center pivot (49) until contact is made with ball of pivot stud (50). Then turn handle adaptor (52) out approximately 1/4 turn and tighten jam nut (51).
  10. Slide molded bellows (53) onto handle adaptor (52). Install nut (55) and lock washer (54) onto handle (56). Install handle (56) into handle adaptor (52) and lock with nut (55).
  11. Adjust handle angle perpendicular to base plate (45) by turning the pivot stud. Adjust with a standard screwdriver inserted in hole located on back side of base plate. After handle is adjusted, tighten jam nut (44).
- NOTE:** *Handle must return freely to neutral position from all working positions.*
12. Slip molded bellows (53) onto retaining plate (46).

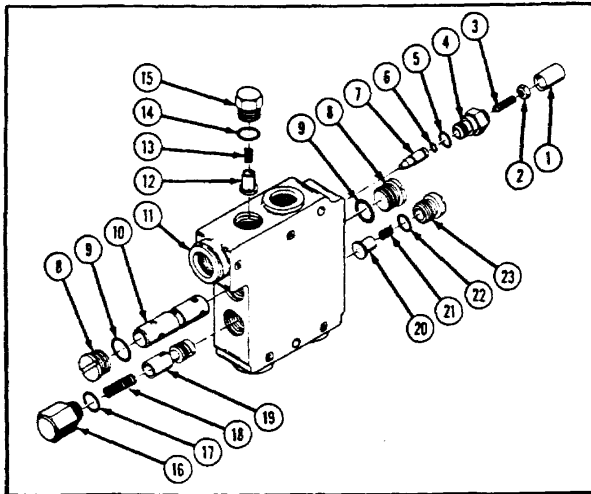
# MAINTENANCE

## SELF-LEVELING VALVE SERVICE

The optional self-leveling valve is designed to be reliable and easy to service. The valve body and spools are not sold as separate repair items because the body is factory honed to fit the spools. If the valve should malfunction during the warranty period, return the complete valve assembly, without disassembling, to your authorized service department or contact your authorized service department for instructions. Unauthorized disassembly of the valve in the warranty period will VOID WARRANTY.

The following is an outline of the procedure for disassembly, inspection and reassembly of the valve. Replace any damaged or worn-out parts.

**NOTE:** It is advisable to mark or tag all hoses and parts before disassembling so they can be reinstalled properly.



## VALVE DISASSEMBLY

**NOTE:** Discard used o-rings as they are removed.

1. Plug all ports and thoroughly clean outside of valve.
2. Unscrew plug (16), carefully, to remove spring (18) and unloading spool (19). Remove o-ring (17) from plug (16).
3. Unscrew plugs (8) to remove flow divider spool (10). Remove o-rings (9) from plugs (8).
4. Carefully unscrew plug (23) to remove spring (21) and plunger (20). Remove o-ring (22) from plug (23). Repeat for plug (15), spring (13), plunger (12) and o-ring (14).
5. Remove protective cover (1) from adjustment cap (4) to access set screw (3) and jam nut (2). Unscrew jam nut (2) and set screw (3) from adjustment cap (4). Unscrew adjustment cap (4) from valve body (11).
6. Remove adjustment pin (7) from cap (4) and o-rings (5 & 6) from adjustment cap (4) and pin (7).  
remove

## VALVE PARTS INSPECTION

**NOTE:** Remove any nicks or burrs from all parts except valve body bores and spools with a fine emery cloth. Clean emery cloth dust from parts before reinstalling.

1. Clean all parts, including valve body in a suitable cleaning solvent, then use air pressure to blow any dirt or excess solvent from all parts.
2. Inspect valve body bores (11) for scoring or foreign material.
3. Examine valve spools (10 & 19) for nicks and burrs. The outer diameters should be smooth and free of scratches. Make sure dampening orifice in unloading spool (19) is free of foreign material.
4. Inspect plunger seats in valve body (11) and plungers (12 & 20) for excessive wear, burrs or roughness.
5. Examine tapered portion of adjustment pin (7) for damage.
6. Inspect all springs (13, 18 & 21) for excessive wear or damage.
7. Replace all worn or damaged parts.

**NOTE:** The valve body and spools are not sold as separate repair items because the body is factory honed to fit the spools. If valve body or either spool is damaged, it is necessary to replace the entire valve.

## VALVE REASSEMBLY

1. Lubricate all parts, including replacement o-rings, with clean hydraulic fluid from tractor system.
2. Install replacement o-rings (9, 14, 17 & 22) onto all plugs (8, 15, 16 & 23). Install o-rings (6 & 5) into outer grooves of adjustment pin (7) and cap (4).
3. Install unloading spool (19), spring (18) and plug (16).
4. Install flow divider spool (10) making sure that internal orifice is toward port "B". Install plugs (8).
5. Install plungers (12 & 20), springs (13 & 21) and plugs (15 & 23).
6. Press adjustment pin (7) into adjustment cap (4) and install into valve body (11). Screw adjustment screw (3) approximately 5/16" into adjustment cap (4), then install, but do not tighten, jam nut (2).
7. After valve has been installed and plumbed to loader and proper flow split has been achieved (see instructions supplied with self-leveling kit), tighten jam nut (2) to keep valve in adjustment, then press protective cover (1) onto adjustment cap (4).

MAINTENANCE

# MAINTENANCE

Regular maintenance of your loader and hydraulic system will insure maximum loader efficiency and long life.



**WARNING:** NEVER perform maintenance beneath a raised loader unless loader is properly supported to prevent accidental lowering.

## DAILY MAINTENANCE

- Check fluid level of tractor hydraulic system before starting each day's operation. If necessary, add hydraulic oil as recommended in your tractor operator's manual.
- After every eight hours of operation, lubricate all twelve grease fittings: one at each end of lift boom arms and one at rod and base ends of each lift and bucket cylinder.
- After every ten hours of operation, check all hardware and tighten where required.
- Replace hoses immediately if they are damaged by a cut or scrape, extruded at the fittings or leaking. Hydraulic oil leaks should be repaired promptly to avoid loss of oil and serious personal injury from escaping oil.

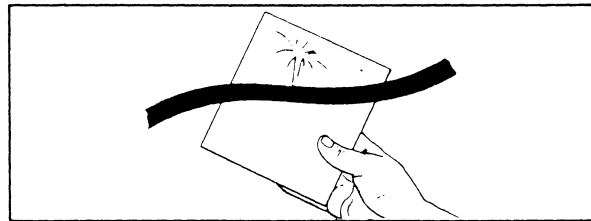
## HYDRAULIC PRESSURE CHECK

Following procedure outlines hydraulic pressure check.

1. Obtain a pressure gauge that measures 3000PSI in 50 PSI increments.
2. Install gauge into the hydraulic line connecting the loader valve and to the base port of bucket cylinders.
3. Start engine and adjust to 1500-1800 RPM.
4. Push bucket control lever to pressurize the hydraulic line with the gauge attached. Hold the control until the cylinders reach the fully extended position. Holding the control with cylinders fully extended will give you the hydraulic system pressure on the gauge.
5. If pressure is not correct, refer to "TROUBLESHOOTING" section for possible remedy or contact your dealer.

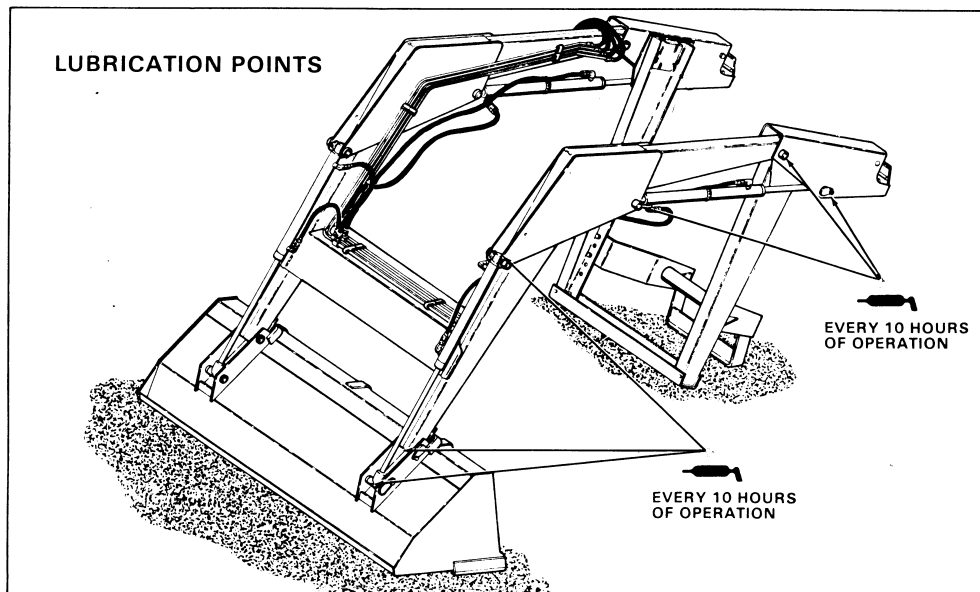


**WARNING:** Use a piece of wood or cardboard rather than hands and wear eye protection when searching for hydraulic leaks. Escaping hydraulic oil under pressure can have sufficient force to penetrate the skin. If any fluid is injected into skin, obtain medical attention immediately or gangrene may result.



MAINTENANCE

## LUBRICATION POINTS



# MAINTENANCE

## TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY
1. Loader slow or will not lift and/or dump.	<ol style="list-style-type: none"> <li>1. Hydraulic oil too thick.</li> <li>2. Oil filter plugged.</li> <li>3. Hydraulic pump worn.</li> <li>4. Oil line restricted or leaking.</li> <li>5. Control valve does not shift properly.</li> <li>6. Air in hydraulic system.</li> <li>7. Cylinder leaks.</li> <li>8. Faulty valve.</li> </ol>	<ol style="list-style-type: none"> <li>1. Change to proper oil.</li> <li>2. Clean or replace filter.</li> <li>3. Repair or replace pump.</li> <li>4. Check all hoses and tubes for leaks, damage or restrictions. Replace damaged or restricted hoses or tube lines.</li> <li>5. Inspect, clean, repair or replace valve.</li> <li>6. Cycle lift cylinders and bucket cylinders several times to free system of air.</li> <li>7. Replace seals. See "Cylinder Service."</li> <li>8. Clean or replace valve.</li> </ol>
2. Loader chatters or vibrates when raising or lowering.	<ol style="list-style-type: none"> <li>1. Air leak in pump inlet line.</li> <li>2. Air in hydraulic system.</li> <li>3. Oil level too low.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check, tighten or replace inlet line.</li> <li>2. Cycle lift cylinders and bucket cylinders.</li> <li>3. Add oil as required.</li> </ol>
3. Oil leaks.	<ol style="list-style-type: none"> <li>1. Loose connections.</li> <li>2. Defective fittings or hoses.</li> <li>3. Worn or damaged o-ring or wiper seal in cylinder rod end.</li> <li>4. Worn or damaged o-rings in valve.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten fittings.</li> <li>2. Replace defective parts.</li> <li>3. Install a seal repair kit. See "Cylinder Service."</li> <li>4. Install an o-ring repair kit.</li> </ol>
4. Insufficient lift capacity.	<ol style="list-style-type: none"> <li>1. Load is greater than boom lift capacity.</li> <li>2. Improper hydraulic pump operation.</li> <li>3. Internal boom cylinder leakage.</li> <li>4. Improper hydraulic valve operation.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check loader specifications.</li> <li>2. Repair or replace pump.</li> <li>3. Replace any worn parts and install seal repair kit. See "Cylinder Service."</li> <li>4. Repair or replace valve.</li> </ol>
5. Excessive wear on bucket cutting edge.	<ol style="list-style-type: none"> <li>1. Bucket is riding on cutting edge instead of wear pads.</li> </ol>	<ol style="list-style-type: none"> <li>1. Use boom "FLOAT" position or bucket level indicator to ensure bucket rides on wear pads.</li> </ol>

If loader is equipped with hydraulic self-leveling option:







PROBLEM	POSSIBLE CAUSE	REMEDY
1. Boom delay at start of self-level or unstable self-level.	<ol style="list-style-type: none"> <li>1. Air in system.</li> </ol>	<ol style="list-style-type: none"> <li>1. Cycle lift cylinders and bucket cylinders several times to free system of air.</li> </ol>
2. Loaded bucket dumps or uncurls when control valve spool is in neutral.	<ol style="list-style-type: none"> <li>1. Unloading spool is leaking.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove and inspect unloading spool for damage.</li> </ol>
3. Insufficient self-level.	<ol style="list-style-type: none"> <li>1. Set screw is out of adjustment.</li> <li>2. Spring on unloading spool is broken.</li> <li>3. Flow divider spool is stuck towards adjustment set screw side.</li> </ol>	<ol style="list-style-type: none"> <li>1. Readjust set screw to achieve proper flow split.</li> <li>2. Remove plug and replace unloading spool spring.</li> <li>3. Remove flow divider spool and check for damage.</li> </ol>
4. Bucket dumps faster than boom raises. Too much self-level.	<ol style="list-style-type: none"> <li>1. Set screw is out of adjustment.</li> <li>2. Flow divider spool is stuck towards port B.</li> <li>3. Flow divider spool is installed wrong.</li> </ol>	<ol style="list-style-type: none"> <li>1. Readjust set screw to achieve proper flow split.</li> <li>2. Remove flow divider spool and inspect for damage.</li> <li>3. Remove spool and install with internal orifice toward port B.</li> </ol>
5. With bucket dumped, boom is slow starting to raise.	<ol style="list-style-type: none"> <li>1. Dampening orifice in unloading spool is plugged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove unloading spool and clean dampening orifice.</li> </ol>
6. Bucket does not move in self-level.	<ol style="list-style-type: none"> <li>1. Set screw is screwed in all the way.</li> <li>2. Dampening orifice in unloading spool is plugged.</li> <li>3. Ports A and B are plumbed backwards.</li> </ol>	<ol style="list-style-type: none"> <li>1. Readjust set screw to adjust proper flow split.</li> <li>2. Remove unloading spool and clean dampening orifice.</li> <li>3. Reverse hoses on ports A and B of self-level valve.</li> </ol>
7. Bucket curls in self-level.	<ol style="list-style-type: none"> <li>1. Ports C and D are plumbed backwards.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reverse hoses on ports C and D of self-level valve.</li> </ol>
8. External leakage.	<ol style="list-style-type: none"> <li>1. Damaged flow divider plug o-ring.</li> <li>2. Damaged plunger plug o-ring.</li> <li>3. Damaged unloading spool plug o-ring.</li> <li>4. Damaged adjustment cap o-ring.</li> <li>5. Leakage around set screw.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove plug and replace damaged o-ring.</li> <li>2. Remove plug and replace damaged o-ring.</li> <li>3. Remove plug and replace damaged o-ring.</li> <li>4. Remove adjustment cap and replace damaged o-ring.</li> <li>5. Remove adjustment cap and replace damaged o-ring on set screw.</li> </ol>

MAINTENANCE

# MAINTENANCE

## GENERAL TORQUE SPECIFICATIONS

USE THE FOLLOWING TORQUES WHEN SPECIAL TORQUES ARE NOT GIVEN

AMERICAN STANDARD CAP SCREWS					METRIC CAP SCREWS												
SAE Grade	5				8				Metric Class	8.8				10.9			
										 				 			
Cap Screw	TORQUE				TORQUE				Cap Screw	TORQUE				TORQUE			
Size	FT-LBS		Nm		FT-LBS		Nm		Size	FT-LBS		Nm		FT-LBS		Nm	
Inches	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	Millimeters	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
1/4-20	6.25	7.25	8.5	10	8.25	9.5	11	13	M6x100	6	8	8	11	9	11	12	15
1/4-28	8	9	11	12	10.5	12	14	16	M8 x 1.25	16	20	215	27	23	27	31	36.5
5/16 - 18	14	15	19	20	18.5	20	25	27	M10 x 1.50	29	35	39	47	42	52	57	70
5/16 - 24	17.5	19	23	26	23	25	31	34	M12 x 1.75	52	62	70	84	75	91	102	123
3/8 - 16	26	28	35	38	35	37	47.5	50	M14 x 2.00	85	103	115	139	120	146	163	198
3/8 - 24	31	34	42	46	41	45	55.5	61	M16 x 2.50	130	158	176	214	176	216	238	293
7/16 - 14	41	45	55	61	55	60	74.5	81	M18 x 2.50	172	210	233	284	240	294	325	398
7/16 - 20	51	55	69	74.5	68	75	92	102	M20 x 2.50	247	301	335	408	343	426	465	577
1/2 - 13	65	72	88	97.5	86	96	116	130	M22 x 2.50	332	404	450	547	472	576	639	780
1/2 - 20	76	84	103	114	102	112	138	152	MM24 x 3.00	423	517	573	700	599	732	812	992
9/16 - 12	95	105	129	142	127	140	172	190	M27 x 3.00	637	779	863	1055	898	1098	1217	1488
9/16 - 18	111	123	150	167	148	164	200	222	M30 x 3.00	872	1066	1181	1444	1224	1496	1658	2027
5/8 - 11	126	139	171	188	168	185	228	251									
5/8 - 18	152	168	206	228	203	224	275	304									
3/4 - 10	238	262	322	355	318	350	431	474									
3/4 - 16	274	305	371	409	365	402	495	544									
7/8 - 9	350	386	474	523	466	515	631	698									
7/8 -14	407	448	551	607	543	597	736	809									
1 - 8	537	592	728	802	716	790	970	1070									
1 - 14	670	740	908	1003	894	987	1211	1337									

NOTE: These values apply to fasteners as received from the supplier, dry or when lubricated with normal engine oil. They do not apply if special graphite or molydisulphide greases or other extreme pressure lubricants are used.

MAINTENANCE

### Torque Specifications for 37° JIC Fittings

Size	Thread Size	Assembly Torque		Tube Connection F.F.F.T.	Swivel Nut or Hose Connection F.F.F.T.
		in. lb.	ft. lb.		
-4	7/16-20	140 ± 10	12 ± 1	2	2
-5	1/2-20	180 ± 15	15 ± 1	2	2
-6	9/16-18	250 ± 15	21 ± 1	1 1/2	1 1/4
-8	3/4-16	550 ± 25	45 ± 5	1 1/2	1
-12	1 1/16-12	1000 ± 50	85 ± 5	1 1/4	1
-16	1 5/16-12	1450 ± 50	120 ± 5	1	1
-20	1 5/8-12	2000 ± 100	170 ± 10	1	1
-24	1 7/8-12	2400 ± 150	200 ± 15	1	1
-32	2 1/2-12	3200 ± 200	270 ± 20	1	1

### Torque Specifications for SAE O-Ring Fittings

Size	Thread Size	Assembly Torque		F.F.F.T.
		in. lb.	ft. lb.	
2	5/16-24	90 ± 5	7.5 ± 0.5	1 ± .25
3	3/8-24	170 ± 10	14 ± 1	1 ± .25
4	7/16-20	220 ± 15	18 ± 1	1 ± .25
5	1/2-20	260 ± 15	22 ± 1	1 ± .25
6	9/16-18	320 ± 20	27 ± 2	1.5 ± .25
8	3/4-16	570 ± 25	48 ± 2	1.5 ± .25
10	7/8-14	1060 ± 50	90 ± 5	1.5 ± .25
12	1 1/16-12	1300 ± 50	110 ± 5	1.5 ± .25
14	1 3/16-12	1750 ± 75	145 ± 6	1.5 ± .25
16	1 5/16-12	1920 ± 25	160 ± 6	1.5 ± .25
20	1 5/8-12	2700 ± 150	225 ± 12	1.5 ± .25
24	1 7/8-12	3000 ± 150	250 ± 12	1.5 ± .25
32	2 1/2-12	3900 ± 200	325 ± 15	1.5 ± .25



**RHINO  
LIMITED WARRANTY**

**1. LIMITED WARRANTIES**

- 1.01. Rhino warrants for one year from the purchase date to the original non-commercial, governmental, or municipal purchaser ("Purchaser") and warrants for six months to the original commercial or industrial purchaser ("Purchaser") that the goods purchased are free from defects in material or workmanship.
- 1.02. Manufacturer will replace for the Purchaser any part or parts found, upon examination at one of its factories, to be defective under normal use and service due to defects in material or workmanship.
- 1.03. This limited warranty does not apply to any part of the goods which has been subjected to improper or abnormal use, negligence, alteration, modification, or accident, damaged due to lack of maintenance or use of wrong fuel, oil, or lubricants, or which has served its normal life. This limited warranty does not apply to any part of any internal combustion engine, or expendable items such as blades, shields, guards, or pneumatic tires except as specifically found in your Operator's Manual.
- 1.04. Except as provided herein, no employee, agent, Dealer, or other person is authorized to give any warranties of any nature on behalf of Manufacturer.

**2. REMEDIES AND PROCEDURES.**

- 2.01. This limited warranty is not effective unless the Purchaser returns the Registration and Warranty Form to Manufacturer within 30 days of purchase.
- 2.02. Purchaser claims must be made in writing to the Authorized Dealer ("Dealer") from whom Purchaser purchased the goods or an approved Authorized Dealer ("Dealer") within 30 days after Purchaser learns of the facts on which the claim is based.
- 2.03. Purchaser is responsible for returning the goods in question to the Dealer.
- 2.04. It after examining the goods and/or parts in question, Manufacturer finds them to be defective under normal use and service due to defects in material or workmanship, Manufacturer will:
  - (a) Repair or replace the defective goods or part(s) or
  - (b) Reimburse Purchaser for the cost of the part(s) and reasonable labor charges (as determined by Manufacturer) if Purchaser paid for the repair and/or replacement prior to the final determination of applicability of the warranty by Manufacturer.The choice of remedy shall belong to Manufacturer.
- 2.05. Purchaser is responsible for any labor charges exceeding a reasonable amount as determined by Manufacturer and for returning the goods to the Dealer, whether or not the claim is approved. Purchaser is responsible for the transportation cost for the goods or part(s) from the Dealer to the designated factory.

**3. LIMITATION OF LIABILITY.**

- 3.01. MANUFACTURER DISCLAIMS ANY EXPRESS (EXCEPT AS SET FORTH HEREIN) AND IMPLIED WARRANTIES WITH RESPECT TO THE GOODS INCLUDING, BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
- 3.02. MANUFACTURER MAKES NO WARRANTY AS TO THE DESIGN, CAPABILITY, CAPACITY, OR SUITABILITY FOR USE OF THE GOODS.
- 3.03. EXCEPT AS PROVIDED HEREIN, MANUFACTURER SHALL HAVE NO LIABILITY OR RESPONSIBILITY TO PURCHASER OR ANY OTHER PERSON OR ENTITY WITH RESPECT TO ANY LIABILITY, LOSS, OR DAMAGE CAUSED OR ALLEGED TO BE CAUSED DIRECTLY OR INDIRECTLY BY THE GOODS INCLUDING, BUT NOT LIMITED TO, ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES RESULTING FROM THE USE OR OPERATION OF THE GOODS OR ANY BREACH OF THIS WARRANTY. NOTWITHSTANDING THE ABOVE LIMITATIONS AND WARRANTIES, MANUFACTURERS LIABILITY HEREUNDER FOR DAMAGES INCURRED BY PURCHASER OR OTHERS SHALL NOT EXCEED THE PRICE OF THE GOODS.
- 3.04. NO ACTION ARISING OUT OF ANY CLAIMED BREACH OF THIS WARRANTY OR TRANSACTIONS UNDER THIS WARRANTY MAY BE BROUGHT MORE THAN TWO (2) YEARS AFTER THE CAUSE OF ACTION HAS OCCURRED.

**4. MISCELLANEOUS.**

- 4.01. Proper Venue for any lawsuits arising from or related to this limited warranty shall be only in Guadalupe County, Texas.
- 4.02. Manufacturer may waive compliance with any of the terms of this limited warranty, but no waiver of any terms shall be deemed to be a waiver of any other term.
- 4.03. If any provision of this limited warranty shall violate any applicable law and is held to be unenforceable, then the invalidity of such provision shall not invalidate any other provisions herein.
- 4.04. Applicable law may provide rights and benefits to purchaser in addition to those provided herein.

**KEEP FOR YOUR RECORDS**

ATTENTION: Purchaser should fill in the blanks below for his reference when buying repair parts and/or for proper machine identification when applying for warranty.

Rhino Implement Model \_\_\_\_\_ Serial Number \_\_\_\_\_  
Date Purchased \_\_\_\_\_ Dealer \_\_\_\_\_

ATTENTION:  
READ YOUR OPERATORS MANUAL

**RHINO**  
Member of the Alamo Group  
1020 S. Sangamon Ave.  
Gibson City, IL 60936  
800-446-5158





## TO THE OWNER/OPERATOR/DEALER

In addition to the standard Limited Warranty shown on the facing page, Rhino also provides:

1. A TWO-YEAR (24 months) LIMITED WARRANTY\* on non-perishable structural items such as: Loader Boom, Side Frames, Mount Brackets, Backhoe Boom, Dipper, Main Frame, Stabilizer Legs, Swing Bracket, Subframe and Related Mounting Brackets provided they have not been subjected to abuse or misuse and have been properly maintained as noted.

NOTE – “properly maintained” specifically includes, but is not limited to:

- A) Regular lubrication.
- B) Using proper amounts of correct hydraulic fluid.
- C) Regular torque inspection of all fasteners.

2. \*WARRANTY LIMITATIONS – Warranty is ONE-YEAR (12 months) for hydraulic cylinders and seals, pivot pins, wear bushings, hydraulic hoses, buckets or other attachments, wear or cutting edges and tooth bars. After one year (12 months) standard warranty, these items are considered “Wearing Perishable Parts” and replacement is the users’ responsibility.



## TO THE OWNER/OPERATOR/DEALER

To keep your implement running efficiently and safely, read your manual thoroughly and follow these directions and the Safety Messages in this Manual. The Table of Contents clearly identifies each section where you can easily find the information you need.

The OCCUPATIONAL SAFETY AND HEALTH ACT (1928.51 Subpart C) makes these minimum safety requirements of tractor operators:

### REQUIRED OF THE OWNER:

1. Provide a Roll-Over-Protective Structure that meets the requirements of this Standard; and
2. Provide Seatbelts that meet the requirements of this paragraph of this Standard and SAE J4C; and
3. Ensure that each employee uses such Seatbelt while the tractor is moving; and
4. Ensure that each employee tightens the Seatbelt sufficiently to confine the employee to the protected area provided by the ROPS.

### REQUIRED OF THE OPERATOR

1. Securely fasten seatbelt if the tractor has a ROPS.
2. Where possible, avoid operating the tractor near ditches, embankments, and holes.
3. Reduce speed when turning, crossing slopes, and on rough, slick, or muddy surfaces.
4. Stay off slopes too steep for safe operation.
5. Watch where you are going -especially at row ends, on roads, and around trees.
6. Do not permit others to ride.
7. Operate the tractor smoothly -no jerky turns, starts, or stops.
8. Hitch only to the drawbar and hitch points recommended by the tractor manufacturer.
9. When the tractor is stopped, set brakes securely and use park lock, if available.

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**Keep children away from danger all day, every day...**

**Equip tractors with rollover protection (ROPS) and keep all machinery guards in place...**

**Please work, drive, play and live each day with care and concern for your safety and that of your family and fellow citizens**

